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THE CENTRAL STATION AND THE LAUNDRY.

Particular attention is directed to the article, appearing on another page of this issue, discussing the lack of co-operation which exists between central stations and laundries and urging a closer relationship which, it is pointed out, would be mutually profitable. A severe indictment of central-station solicitors is made. This expression, coming from a leading laundry journal, carries great weight and if it truly indicates actual conditions, should be given very serious consideration by central-station commercial departments.

One statement furnishing food for thought is to the effect that central stations have wanted the laundry business badly enough to spend considerable time and money soliciting it, but not badly enough to spend one cent studying conditions. The laundry has needed central-station service badly enough for individuals to believe representations without investigation and install the service. The central station has made little or no return, and the laundry has paid heavily to learn to distrust statements made.

It seems absurd that such conditions should exist between two parties, one with current to sell and the other with not only a desire but almost with necessity to become a purchaser for a portion of current used. The modern laundry is an electrically operated one and thus needs considerable energy. Part of this it can better and more cheaply generate, because of steam conditions, and the remainder it wishes to purchase, and yet little business results. Many thousands of dollars of business a year is available to the central station from the laundry, as energy is needed for overtime work, for night operation, for sign lighting and for breakdown service. It is true that central stations in quite a number of cases have secured the entire business from laundries and even, in fact, effected savings over steam or isolated plant operation, but in practically every case it will be found that the plant secured is a very small one, below the average, where power is used continuously and washing and other operations requiring steam, conducted but one or two days per week. The policy of the central station should be to supply whatever needs the laundry may have for its service and not try to foist upon it more than is to the laundry's advantage.

Our contemporary states that the objectionable conditions will be remedied within ten years. We

make bold to state that different conditions are already in existence today. Those central-station commercial departments which are alive to their own interests are already making comprehensive studies of the needs of the various industries in the way of electric service, and aiming to supply those needs in a way that shall be satisfactory to the customer, so that he not only remains a customer, but becomes a booster and a permanent advertiser of central-station service. Any central station which is not already doing this is losing an opportunity to further its own interests, and should immediately take steps to inaugurate a more intelligent soliciting policy, and the series of articles in the ELECTRICAL REVIEW AND WESTERN ELECTRICIAN dealing with applications of electricity in various industries will be found useful in carrying out such a program. Referring specifically to the laundry business, the article in our issue of January 6 of this year pointed out the existence of those special requirements to which our contemporary refers and called attention to the fact that solicitation of such business could only result satisfactorily when proper study is given to them.

SUPPLEMENTING THE STREET-LIGHTING LOAD.

In the case of many central stations, the load curve during the small hours of the night is far from satisfactory, from the standpoint of economical operation. The largest block of energy undergoing distribution is generally applied to street lighting, and even a city using as many as 1,000 arc lamps of the 4-ampere magnetite type demands little over 400 kilowatts at the alternating-current busbars. The load is good so far as it goes, but in many cases represents too small a proportion of the rating of a single generating unit to enable the plant to be run at a low cost per unit of output. Hence anything which can be done to increase the night load deserves the close attention of the sales force, for it offers the double reward of enlarged revenue and improved efficiency at the station.

Passing by the well known benefits of municipal pumping and electrochemical service as off-peak business under favorable conditions, it is of interest to note some of the smaller applications of electricity which are worth cultivating with reference to the night hours. Individually they are perhaps of trifling importance, but collectively they act in the right direction, and in not a few cases add revenue at the maximum net rate. Among these applications are the use of electricity in the illumination of excavations and other construction work carried on at night, the lighting of street designation signs, advertising and public clocks, and the operation of lamps, fans, etc., in night lunch carts, 24-hour restaurants, hotel offices and corridors, police stations, hospitals and asylums. The lighting of physicians' night bells has been shown to be a highly profitable business, justifying at least a half day's soliciting per installation. In the construction field so much work is now rushed night and day that the large volume of business offered to city lighting companies deserves the most vigorous solicitation. Here the flaming arc meets the needs in many cases with great economy, and even in the small country town the local central station should capture the lighting of road excavations, livery-stable entrances and any offices open all night, including the local telephone exchange.

The offer of a flat rate without the cost of a meter is desirable in some of these cases, where the oil lamp and the candle cannot be driven out except by offering electric service on the basis of an almost insignificant investment. So far as possible, efforts should be made to encourage all-night clock tower lighting and all-night signs on establishments which never close, even though the night clerk or waiter may be on duty only at the call of an arousing bell. In institutions of many kinds there is nothing to be gained on the score of economy by running an electric generating plant say between midnight and dawn, and here the central station should supply the load from its regular circuits, and at a rate which will pay the institution to bank its fires and shut down its midnight-dawn service and at the same time furnish desirable revenue to the lighting company. A special study of these types of load will pay. The local owl service on good-sized street railways is worth capturing in some cases, even at the cost of purchasing a motor-generator of from 300 to 500 kilowatts capacity. A price of even 7 or 8 mills per kilowatt-hour for such service will sometimes pay a handsome return upon the cost of handling the business, including fixed charges upon the motor-generator or rotary installation required.

A RECORD FOR CONTINUITY OF SERVICE.

One of the arguments generally used in advocacy of central-station service in preference to the operation of an isolated plant is continuity of service, and every central station aims to avoid any interruption to its service. In some cases contracts stipulate a severe penalty for interruptions, and not only the reputation of the central station, but its financial interest, is dependent upon maintaining unbroken service.

The first central station to be operated in this country was the famous Pearl Street station in New York City, which began operations on September 4, 1882. It was put in commission by the Edison Electric Illuminating Company, which was licensed to use the Edison patents. This was not only the first central station to undertake commercial business in the line of electric lighting, but it has also set an example in continuity of service which will be emulated by many. In the 30 years during which New York City has been supplied with electric service there

have been only two interruptions. One of these was in 1890, when fire destroyed the building on Pearl Street, and the combined time of interruption was less than 12 hours. Thus, with the exception of a half day, New York City has had a continuous supply of electrical energy for over 30 years.

Upon another page will be found a note regarding this thirtieth anniversary, which was suitably observed by the New York Edison Company.

ELECTRIC TRACTION IN SWITZERLAND.

Four years ago a commission investigated the feasibility of electrifying the steam railroads of Switzerland and made an adverse report. Recently the same commission has made a second investigation and an announcement of its report will be found upon another page. It is to be noted that the present report is favorable to electrification, this conclusion having been reached after a careful consideration of the advantages of electric traction and the amount of energy which would be necessary therefor, and the sources of supply.

It is proposed to utilize the water powers which are always available in such a mountainous country, and a detailed consideration shows that 1,800,000,000 kilowatt-hours would be available yearly and that the requirements for railroad purposes amount to only 1,200 to 1,500 millions measured at the power house. This is based upon an estimated traffic equal to double that which existed in 1904.

The commission has studied all the systems which are in use elsewhere and has decided in favor of single-phase, at 15,000 volts and 15 cycles.

It seems, with such a favorable report upon the matter that electrification is likely soon to be a reality throughout Switzerland. In addition to the general advantages of electric traction, there are two additional advantages which are present in any mountainous country. One of these is the nearness of available water powers which provide a source of energy which can be utilized for traction purposes only through the medium of electrification and the second is the presence of numerous tunnels in such a region which make the operation of smoke-belching locomotives very undesirable from the standpoint of ventilation. The latter consideration has led to the electrification of short stretches of steam railroad lines in this country, such as the Cascade and Hoosac tunnels and the submarine tunnels at New York City, Detroit and elsewhere. It might seem that the first consideration would influence some of the transcontinental railroads to electrify the entire mileage in the districts of the Rocky Mountains and Sierra Nevada, but these developments cannot be looked for until the density of traffic in those sections becomes greater than it now is. The superiority in the cost of operation is most manifest where traffic is dense, and for this reason electrification in the Eastern States is likely to proceed more rapidly than in the mountainous parts of this country.

THE TRUTH ABOUT PUBLIC OWNERSHIP.

A recent utterance by Cardinal Gibbons at Baltimore upon the ownership of public utilities deserves the widest circulation in these days of anti-corporation agitation. The eminent prelate points out that the large corporations of the country are rapidly passing into the hands of the people through the distribution of securities; that 2,000,000 persons own the railroads of the United States, and that extraordinary increases in the number of stockholders have taken place in many utilities during the past decade. In this period the number of holders of Pennsylvania Railroad stock has risen from 27,870 to over 73,000; of Baltimore & Ohio, from 3,256 to over 11,000; of Great Northern, from 700 to 18,000; of New York Central, from 9,872 to over 22,000; and in the short space of five years the number of holders of American Telephone & Telegraph has grown from 18,000 to over 50,000. This is the obvious result of the increasing popularity of public-utility securities. The significance of this should not be overlooked by those who are constantly demanding that municipal and govermental ownership shall take the place of the present encouragement of private initiative which is responsible for the splendid development attained in the American business world—a development which is reflected in increasing savings-bank deposits and the establishment of a scale of living immeasurably above that known to the men and women of the last century.

The very crux of the problem of dealing with "big business" is contained in the following quotation from the cardinal's interview: "I believe in the proper regulation of big business combinations, and the broad-minded men at the head of these vast business enterprises, would, I am sure, welcome fair and intelligent government control. Such control should be of a nature to assure the people good service at prices which would protect the honest investor; it should prevent industrial warfare, should end political interference and should encourage honest effort to serve the people with the utilities which they require. . . . Public ownership of the proper kind is already here. Millions of our people have a direct and personal interest in the public-serving business, and they are not going to be misled by any of the unfounded and theoretical beliefs of the Socialists of government ownership. How would big enterprises be conducted under government ownership? It is but necessary to learn of the numerous disastrous failures of government operations in European countries to indicate what might happen here. Reckless expenditure of the public funds, inefficiency of management, depreciation in service, political control and corruption and public dissatisfaction are all certain to follow if ever the citizens of the United States become so neglectful of their own welfare as to adopt government ownership of the great public utilities."

Illuminating Engineering Society's Convention at Niagara Falls.

The arrangements for the sixth annual convention of the Illuminating Engineering Society, which, as previously announced, is to be held at Niagara Falls, Ont., from September 16 to 19, are so far advanced as to insure a very successful meeting. The Clifton Hotel will serve as headquarters for the convention activities, which this year will be of a wider range than heretofore, covering six half-day and two evening technical sessions and a multitude of entertainment features among which are a reception and dance, the annual subscription banquet, a series of inspections of the Falls and the scenic and industrial points of interest, and many other social events.

The technical program of papers and reports is given below, subject to slight rearrangement and division among the different sessions: Addresses of welcome, by the presidents of the Boards of Trade of Niagara Falls, Ont., and Niagara Falls, N. Y. —Response, by W. J. Serrill, treasurer of the Society.—A presidential address, by V. R. Lansingh, president of the Society.—Report of Committee on Progress, Louis Bell, chairman.— Report of Committee on Nomenclature and Standards, A. E. Kennelly, chairman.—Symposium on high-pressure gas lighting, by F. W. Goodenough, Oscar Klutte and R. N. Zeek, representing Great Britain, Germany and the United States, respectively.—"Deterioration of Gas Lamps and Mantles in Service," by R. F. Pierce.—"Recent Developments in Series Street Lighting," by Charles P. Steinmetz.—"Steel-mill Lighting," by C. J. Mundo.—"Characteristics and Tests of Inclosed-Arc Flame Carbons," by A. T. Baldwin and R. B. Chillas, Jr.—"Lighting of Small Stores," by C. L. Law and A. L. Powell.—"Heterochromatic Photometry and the Primary Standard of Light," by H. E. Ives.—"Diffuse Reflection," by P. G. Nutting.—"Some Reflecting Powers of Painted Interior Walls," by C. W. Jordan.—"A Study of Natural and Artificial Light Distribution," by M. Luckiesh.—"The Engineering Principles of Indirect Lighting," by Thomas W. Rolph.—"The Physiology of Vision," by T. A. Woodruff.—"Tests for the Efficiency of the Eye Under Different Systems of Illumination and a Preliminary Study of the Causes of Discomfort," by C. E. Ferre.—"Visual Acuity," by P. W. Cobb.—"Color Values of Illuminated Surfaces," by Bassett Jones, Jr.—"Research Methods," by E. P. Hyde.—"An Absolute Reflectometer," by P. G. Nutting.—"A Proposed Method of Determining the Diffusion of Translucent Media," by E. L. Elliott.—"The Determination of Illumination Efficiency," by E. L. Elliott.—"Lighting of the New Office Building of the Buffalo General Electric Company," by W. D'A. Ryan.—A potpourri of miscellaneous general discussions.

New York Electric Vehicle Association.

A meeting of the electric vehicle manufacturers and the central station interests of New York City, held on September 5, resulted in the forming of a co-operative organization known as The New York Electric Vehicle Association.

Among other plans under consideration by the Plan and Scope Committee are the establishment of a common showroom to be centrally located and equipped with model charging facilities and the maintenance of a list of duly inspected and reliable garages about the city, together with a catalog of other useful touring information.

The object of the new association is to boom the electric-vehicle industry in New York City, past experience having demonstrated the fact that united effort up to a certain point is indispensable today to the successful promotion of a business of this nature. It is to be distinctly understood, however, that this local association will in no way conflict with The Electric Vehicle Association of America, the national organization.

The membership of the Association will consist of corporations and firms engaged in the manufacture and sale of electric vehicles, electric-vehicle batteries, or electric motors, and corporations and firms engaged in the sale of electric current. A permanent paid secretary will shortly be appointed who will devote his entire time to Association work. He will at all times be at the call of members who may require such services as he may have at his command, rendering any assistance which would tend to a better, smoother, or more convenient condition or arrangement under which electric automobiles might be operated. Among other considerations of importance is the possibility of co-operative advertising on a large scale. Announcement will be made later regarding officers.

New Wireless Station in Wales.

It has been decided that the new high-power trans-oceanic wireless station, which is to be erected by the Marconi Company under contract with the British Post Office, shall be located near Carnarvon, in Wales. It will be the largest wireless station in the world.

Opening Meeting of Commonwealth Edison Section.

At the first fall meeting of the Commonwealth Edison Section of the National Electric Light Association, held at Association Hall, Chicago, on September 5, John F. Gilchrist spoke entertainingly of the wonderful development and extension of our electrical systems and the things that might be expected in the future. His points were illustrated by numerous examples.

Mr. Gilchrist called attention to the state of affairs that existed years ago, when it was necessary to change cars five times in going from Chicago to New York by rail. Such a condition is comparable to the various independent electrical companies which now exist. For economical and dependable operation it is necessary to have large interconnected systems, and satisfactory results can be had only in that way. The speaker also took up briefly the Seattle convention, commenting on its great success and the good that it had done in the industry.

The West, and especially California, said Mr. Gilchrist, is wide awake to its opportunities and this is particularly reflected in its electrical progress. California is a large state and keenly on the lookout for up-to-date methods. Gas, for instance, is used at high pressure and sent through mains over a distance of 15 or 20 miles. This is only an intermediate step, and there is no question that there will soon be a much greater number of high-tension transmission lines there.

In conclusion Mr. Gilchrist spoke of the great opportunities that are open to high-grade electrical men; there are more positions than there are men to fill them, and the man who knows need never lack an opportunity.

The meeting had excellent entertainment features in addition to Mr. Gilchrist's talk, and the large attendance gave promise of a most profitable series of meetings.

Lehigh Valley Train Dispatching.

The Lehigh Valley Railroad is extending the telephone dispatching system on the west end of the main line, between Manchester, N. Y., and Buffalo, N. Y. The installation is expected to be completed by October 1. Between New York harbor and Manchester, a distance of 360 miles, the telephone dispatching system is already in operation. Now there is only one branch on which dispatching is done in the old way, and that will not be for long.

Not only is dispatching done by telephone, but freight and passenger trains and section gangs are supplied with portable telephone sets.

Samuel Sheldon.

The career of Samuel Sheldon, electrical engineer, physicist and educator, is one of interest and positive stimulus to any student of the lives of men who have attained distinct success in their chosen calling.

Samuel Sheldon was born at Middlebury, Vt., in 1862. He received his early education at the Middlebury public schools and the Middlebury High School. He entered Middlebury College in 1879, supporting himself while there by his scholarship. He won and maintained one of the endowment prizes and throughout the four years remained at the head of his class. He was graduated with the degree of A. B. in 1883, and commenced his career as an educator by teaching mathematics at the College until 1886. He received the degree of A. M. in 1887. Dr. Sheldon decided at that time to pursue his studies abroad and entered the University at Wurtzburg in the fall of 1887. During his first year he was selected from several hundred of his fellow students to assist Professor Friederich Kohlrausch in his determination of the ohm for the Bavarian Government. During the next year he held the position of assistant professor of physics and until the time of his graduation from the University in 1888 with the degree of Ph. D.

Samuel Sheldon,
Professor of Electrical Engineering at the Polytechnic Institute.

Upon his return to America, Doctor Sheldon was made head assistant professor of physics at Harvard University under Professor Trowbridge. He resigned in 1889 to accept the position of professor of physics and electrical engineering at the Polytechnic Institute, Brooklyn, N. Y. At this time the Institute was established as a separate branch from the preparatory school and it devolved upon Doctor Sheldon to establish and develop both the electrical and mechanical departments. He established these courses, equipping the shop, mechanical, engineering, physical and electrical laboratories. At his suggestion the Polytechnic Institute instituted in 1894 its department of consulting professors. In this department the students meet men who are prominent in the profession and come in touch with the practical side of the work they are studying. Doctor Sheldon has been brilliantly successful as a teacher. His great ability to analyze deeply, his fine command of engineering English and terminology and his faculty for presenting in the most concise manner just what is essential without circumlocution have endeared him to his students as a master of his work.

Doctor Sheldon has frequently been called to give testimony in both the state and federal courts, and since 1903 he has been an expert of the Swiss Department of Justice and Police. His personality lends itself most forcibly to this class of work and his every evidence of the command of all the faculties necessary for the proper digest and instituting of adequate testimony marks him as a favorite for work of this nature. He has also carried on an extensive consulting engineering practice, especially in electrochemical development, publishing many papers along these lines.

For a number of years Doctor Sheldon has carried on research work, and his experiments upon static generators has been a means of furnishing the American Electrotherapeutic Association and others interested in a study of this phenomena with exact information of the greatest value.

He has been a liberal contributor to the scientific press and is the author of a standard text book on "Direct-Current Machinery," and joint author of another on "Alternating-Current Machinery." These books are used extensively as text books in many of the engineering colleges. He has also been a prolific contributor to the proceedings of the national engineering societies and jointly with Professor Trowbridge he has contributed much to the American Academy, their study on the "Neutralization of Induction" being of the greatest importance.

Doctor Sheldon has attracted a great deal of attention also as a popular lecturer on technical subjects, and for a number of years delivered courses on electricity, magnetism and physics before the Board of Education and the Brooklyn Institute of Arts and Sciences.

Doctor Sheldon has been a member of the American Institute of Electrical Engineers since October 27, 1891. He became an associate member December 16, 1890. He is a life member of the Institute and was president in 1906 and 1907. He has served on numerous important committees and was for six years a manager, four years on the Papers Committee as chairman, and two years, vice-president. At the International Electrical Congress held at St. Louis in 1894 he was secretary of one of the sections and he was also a member of the Electric Jury of Awards.

He has been prominent as a manager of the American Electrochemical Society, president of the New York Electrical Society, fellow of the American Association for the Advancement of Science, member of the American Physical Society, member of the Society for the Promotion of Engineering Education, honorary fellow of the American Electrotherapeutic Association, member of the National Electric Light Association and president of the Department of Electricity of the Brooklyn Institute of Arts and Sciences.

Lower Cable Rates.

The Western Union Telegraph Company has announced reduced rates for cable service to Great Britain at some date not yet fixed. A feature of the new system will be a night letter of 12 words for 71 cents, with five cents for each additional word. Week-end letters will be accepted on Saturday at $1.15 for 24 words. These rates will not apply to Continental Europe. Code messages will not be included in the reduced rates, except that a code address may be used.

Thirty Years of Electrical Supply in New York

Wednesday, September 4, was the thirtieth anniversary of the beginning of commercial incandescent lighting, for in 1882 Thomas A. Edison placed in operation in New York the world's pioneer central station. From a single generator of 125 horsepower in an old brick building in lower Pearl Street current was sent through a system of underground cables to some four hundred lamps in a territory of less than a square mile. The service that was begun on that day has continued until it now covers a territory extending from the Battery to Yonkers, and supplies 129,000 customers.

Instead of the old brick building that housed the generating apparatus there are now two Bastile-like structures that cover two city blocks, while 31 substations are required to convert the high-tension voltage of transmission to the low voltage of distribution; and the historic "Jumbo" of 125 horsepower has given way to a steam turbine of 30,000 horsepower.

The Edison Company of today is the successor of the company that under the personal direction of Thomas A. Edison established the world's first permanent central station in a large city. Organized in December, 1880, it was known as the Edison Electric Illuminating Company, and was the licensee of the Edison Electric Light Company, which held Edison's electric light patents. Two years of preliminary work saw the establishment of a steam generating station, the extension of a distribution system of some 15 miles and the installation of about 400 incandescent lamps. Thirty years of commercial growth has seen this system become one of 1,300 miles of cable, 360 of which are of the high-tension transmission system, while from the 400 incandescent lamps the number has become 5,245,000, the connected load equalling 714,000 horsepower.

Steam boilers were installed in the basement of the reconstructed building at 257 Pearl Street and the generating units were set up on the second floor. These were the now historical "Jumbos," the first type of commercial generating machines in the world. They were six in number, and each was driven by an engine of 125 horsepower. During the summer of this same year the underground distribution system was planned and laid out, and the wiring was installed in the buildings of prospective customers. The wiring of these buildings, the laying of the street mains, and the installation of the generating apparatus was all done under the personal supervision of Mr. Edison.

This station and the six Jumbos continued operations until January 2, 1890, when fire destroyed the building. Only one dynamo was saved. That fire put the lighting system out of business for less than half a day, because the Liberty Street annex, opened in 1887, was able to take up the load, and by placing certain restriction on the use of current, carry the burden until new machinery could be installed at Pearl Street. In 1890 another annex to the Pearl Street station was opened in the Produce Exchange Building.

In the meantime the new Duane-Pearl Street station, the fourth that had been built to meet the increasing demands for electric light, had been completed, and in 1895 the old station was dismantled and sold.

With the exception of this and one other interruption, aggregating together less than 12 hours, Edison service has been continuous in New York since the day the first dynamo was started.

The original Edison plan called for the generation of current at as many as 36 independent stations south of Fifty-ninth Street, each with its own steam-boiler equipment. However, through the use of the high-tension system of transmission, which began on November 3, 1898, it became possible to concentrate all the generating apparatus at one locality, and to operate at various parts of the city, not the steam generating plants that had first been planned, but substations, all connected with the central station by high-tension feeders.

The Waterside Stations of The New York Edison Company built in 1900 and 1905 are the result of the concentration made possible by the system of high-tension alternating-current transmission. They are the largest generating stations in the world, and occupy two city blocks on the East River front and have a capacity of approximately 700,000 horsepower.

There are 40,400 arc lamps on the system and 337,200 horsepower in motors, while 159,000 meters are required to measure the current. The Edison system covers practically the entire island of Manhattan with its 21.93 square miles, and the Borough of the Bronx, which contains more than 40 square miles.

Although the Edison Electric Illuminating Company was the first organized company to do commercial electric lighting, and the Pearl Street plant was the first central station in the world, there were earlier instances of incandescent lighting. Mr. Edison at his home in Menlo Park had laid out an underground system supplying more than 400 lamps; and in 1879 a lighting system had been installed on the steamship Columbia, while less than a month prior to the opening of the Pearl Street station a small generator of a different type had been placed in operation at Appleton, Wis., where a waterfall supplied the power.

Electrification of Swiss Federal Railways.

The electrifying of the entire system of government railways in Switzerland is a question that has been occupying the attention of the Federal Council for several years. The fact that Switzerland produces no coal makes the cost of fuel for operating steam roads an important item in government expenditures, and the further fact that the mountain streams make available a vast amount of water power for the generation of electricity, has encouraged the serious consideration of the proposition to electrify the railways. Water power in Switzerland is also under government control.

Several commissions have been appointed to investigate and report upon the practicability of the scheme, and the most feasible plan of changing the system. After a thorough investigation of the subject and some experiments, the commission has reported in favor of single-phase alternating current with a pressure of 15,000 volts on the overhead wires. A frequency of 15 cycles is favored.

The first work to be undertaken in the application of electricity for propelling power in the state railways will be on the St. Gotthard route, where there are many steep grades and numerous tunnels, the longest of which is over nine miles. The change is especially desirable on this line as it will eliminate the disagreeable passage through many long tunnels now always filled with smoke.

It is estimated that the cost of conversion of the entire government system, aggregating 1,700 miles, will be something like $14,000,000, including water power for electrical generation, while the cost of operation would be reduced about ten per cent as compared with steam power.

Chicago Electric Club.

The Electric Club of Chicago will inaugurate the fall season by a meeting to be held in the Hotel Sherman on September 19.

The Honorable W. E. Mason, former United States Senator from Illinois, will speak on legislative and public questions. Ex-Senator Mason is a prominent figure in public life, and is a forceful, witty and interesting speaker.

The new West room at the Hotel Sherman has just been completed. The conditions for a big meeting are ideal and a record attendance is expected.

Electricity in Lumber Mills.

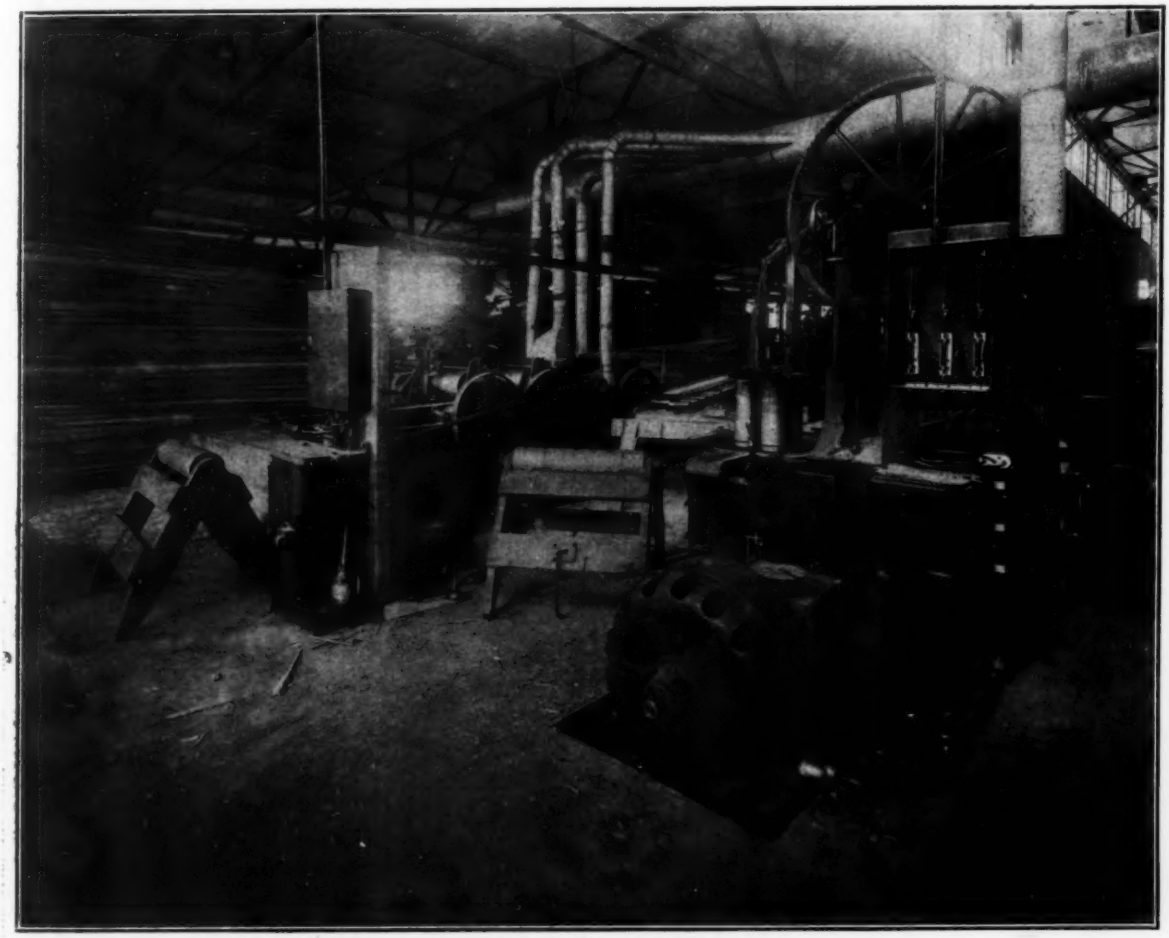
In treating of the application of electric motors to the lumber industry and the opportunities for the sale of power, this discussion will be limited to saw and planing mills handling heavy material, some reference also being made to logging operations.

There is probably no department of the woodworking industry where modern methods of operation are more badly needed than in the saw-mill field. Inasmuch as there are 51,000 saw mills operated in the United States, according to a recent estimate, producing somewhat over 40,000,000,000 feet of lumber annually it goes without saying that the total loss and waste due to inefficient operation must be enormous. The same condition, perhaps on a larger scale, applies to planing mills.

The ideal attainment of modern production is a maximum output from a given investment in plant and machinery. Electric power, in so far as it contributes to this result, is being given an ever-increasing degree of attention where saw-mill and woodworking machinery is used, as experience under the severest service conditions has proven that it possesses advantages of efficiency and economy that meet most successfully the peculiar conditions of the lumber and woodworking industries. It has been demonstrated under the severest service conditions that the electric motor renders possible the most economical approach to the direct application at the machine of the total initial power developed. Also, the better lighting and ventilation, the greater freedom from dust and lessened danger of physical injury, resulting from the removal of belts and shafting, have been found by experience to increase the productive efficiency of the employee. Electric drive minimizes the danger of accidents and delays, and by means of suitably located remote-control switches makes it possible to shut down the entire factory instantly in case of emergency.

An important feature of individual motor drive is the ability to operate any group of machines or any separate machine overtime or at unusual hours without putting the whole plant into operation. This feature is of especial importance when the current is obtained from an outside source, as in that case the cost of running any machine stops when the machine does.

Considered from the central-station standpoint, all saw and lumber mills offer opportunities for profitable business. In the large factories, due to the availability of excessively large quantities of waste fuel produced in manufacturing, central-station power cannot, save in very exceptional cases, be made attractive. However, there is an excellent field for overtime service, and for supplying power for extra machines which are constantly being added in all progressive plants. The factories coming under this classification, however, are few and there are left a great number of plants than can economically purchase current for all their requirements, generating steam for heating and dry kilns from the refuse. By intelligent soliciting on the part of



Individual Motor Drive in Plant of Wells Lumber Company.

central-station men the number of factories coming under this latter classification can be considerably increased.

In soliciting the adoption of electric drive for such plants a great proportion of success depends upon the ability on the part of the central-station power solicitor to correctly analyze existing plant-operating expenses and fixed charges. Ability to do this readily and correctly will go far to demonstrate definitely and convincingly to a prospect the flaws and waste and general field for improvement in his power layout.

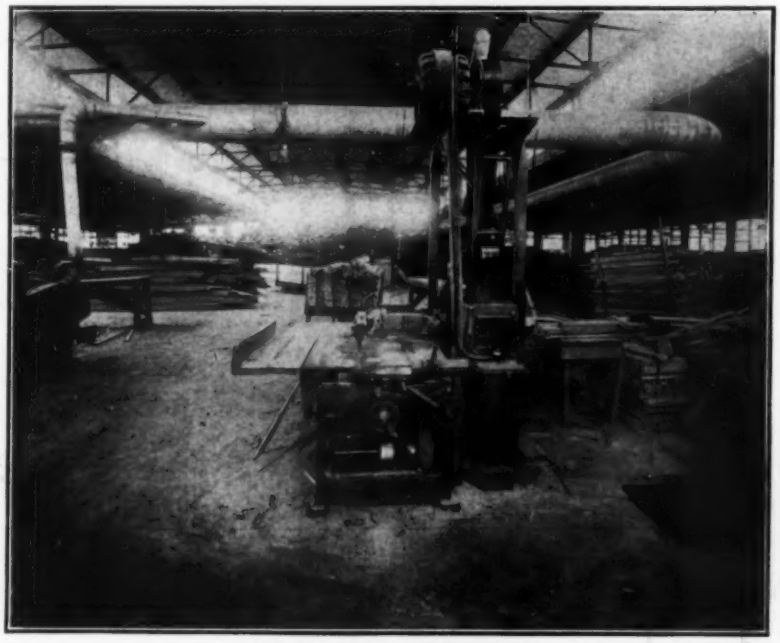
One of the important arguments to be remembered by the power solicitor is the marked reduction in fire risk where central-station power is used. If power is obtained from an adjacent steam plant the fire risk is great and insurance rates correspondingly high. Mechanical drive necessitates either the dangerous proximity of the boiler room or heavy losses in long steam mains or rope transmission. If central-station power is used, all danger from adjoining power plant is removed; in any case, electric drive not only does away with the inflammable dust inevitably carried into the engine room by the large belt, but also makes possible the complete isolation of engine and boiler either by means of solid fireproof walls or by their installation in a separate building. The elimination of heavy line shafts greatly reduces the danger of fire from overheated journal boxes or from spontaneous combustion of accumulated oily waste or shavings. It should be remembered that the rate charged by insurance companies, especially where steam boilers are in close proximity to the working machines, is exceedingly high, and that by installing complete electrical equipment in a modern fireproof building the annual premiums may be reduced from perhaps 7 or 8 per cent to three-quarters or one per cent. In many cases the savings in premiums will go far in making up for the original cost of the electric installation.

Other points to be borne in mind by the solicitor are; electric drive permits uninterrupted operation of tool and the attainment of high shop "time factor"; improves quality of product, as good product from woodworking machinery is largely dependent upon a drive capable of transmitting even and constant torque to the cutting tool; economizes unit cost of product, either by increasing product with a given equipment and personnel, or by direct economies in those charges debited exclusively to power; eliminates shafting and belting, allowing better placing of driven machines and reducing to a minimum the dissemination of sawdust and flying particles; permits the maximum return from those machines whose productive capacity is largely dependent upon the proper maintenance of speed and power, etc.

The selection of motors for service in planing mills presents no especial difficulty. In general the requirements can be met successfully by constant-speed motors and preference should be given the simple squirrel-cage type of polyphase induction motor, as the working conditions in planing mills permit the motors to be started in most cases under light loads. Any demand for variable speed can be met by one of the several forms of pole-changing multi-speed induction motors which are now available.

Owing to the high speed and light moving parts of woodworking machines and the frequent violent application of the load, it is desirable to use belt drive rather than gears or chains, especially as the speed of the driven pulley is usually too high to permit of other than direct or belted connection. The direct drive is coming into vogue in many modern mills and is giving excellent results where the motor has sufficiently generous rating to accelerate rapidly and to withstand overloads. As the average depreciation of

Twenty-Horsepower Motor Belted to Planer.



Motor-Driven Saw Bench.

belting averages 36 per cent per year, it is important to reduce this waste and furthermore do away with any source of slippage between the driving unit and the working pulley.

In the installation of motors in saw mills, if belts are used, it is strongly recommended that the same do not run vertically or have so decided a vertical component as to minimize the arc of contact on the driving pulley and at the same time prevent the use of the belt-tension adjustment on the motor base. Motors may often be conveniently located in an inverted position beneath the floor bearing the machine. If this method is adopted the belt between the motor and machine should be boxed in and the drive arranged, as above stated, at a sufficient angle to be able to make use of the belt-tightener arrangement. There is a wide opportunity for the solicitor or power engineer to use his ingenuity in the layout and novel methods of drive.

One of the most difficult loads for the central station to handle is that of the large exhaust blowers which are used to exhaust the refuse from the machines. Depending upon the size of the mill, one of these blowers may take from 20 to 150 horsepower, and the load is naturally constant throughout the working hours of the plant, therefore, the resultant bill if central-station energy is used, is liable to be a serious impediment to the customer's adoption of motor drive.

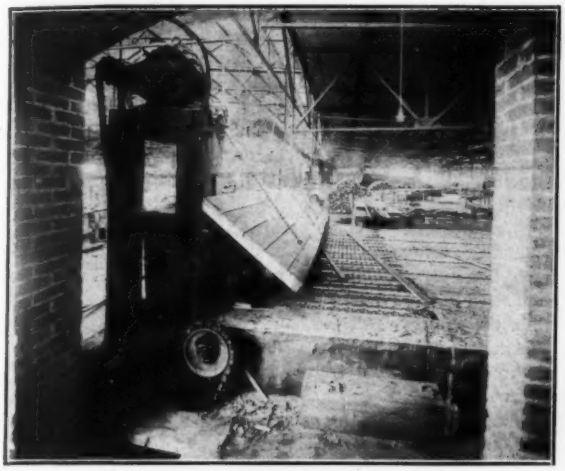
No better illustration can be given of the advantages of electric drive than in cases where it forces competing motive powers out of business in the face of unusually low fuel costs. In this connection the following particulars are given of the successful introduction of electric drive in a representative lumber mill, the adoption of electricity having been effected on the basis of a lower operating cost per year than the original steam plant, even when refuse sawdust and shavings were burned under the boilers.

The local central-station organization in this particular case pointed out that the ideal arrangement for the use of electric energy is a separate motor for each machine, but suggested that when the energy saving by this method ceases to pay 15 per cent on the investment it is not a success from a strictly financial point of view, although the cleanliness, convenience, and flexibility of such an installation sometimes make it more desirable. The conditions in this plant, however, did not seem to warrant a complete installation of individual motor drive.

An analysis of the conditions prevailing under steam operation were found to be as follows:

	Horsepower.
Maximum load on day of test.....	20
Average total load on day of test....	8.8
Friction load on day of test.....	5.5
Average total productive load on day of test	3.3

The average total productive load if the machines had been fully loaded during the entire time on the test, not including the 5.5 horepower of friction would have been 7.96 horsepower. This figure was used in the cost estimates which drove the steam engine from the plant, rather than the actual average productive load. From



Motor-Driven Conveyor.

Motor-Driven Saw Bench.

Motor-Driven Planers.

Motor-Driven Matchers.

the records of the lumber company the following yearly costs of steam power were reduced for two successive years; first year, $1,176; second year, $1,366, giving an average of $1,271, or $106 per month. The principal items were coal, averaging $600 per year, and engineer's wages, average, $526 per year, other small items being oil, waste packing, engine repairs and miscellaneous. None of these small items much exceeded $40 per year individually.

The motors in this mill were arranged as follows:

	Horsepower	R. P. M.
First Floor—Individual Drive—		
Rip saw	5	1700
Planer	10	1700
Sticker, 12-inch	10	1700
Swing saw	3	1700
Second Floor—Individual Drive—		
Planer	7.5	1700
Sticker, 6-inch	5	1700
Rip saw	5	1700
Joiner	3	1700
Dado saw	3	1700
Band saw	3	1120
Group Drive—		
Tenoner, mortiser	5	1700
Sander, emery wheel, grindstone	5	1700

All motors are three-phase, 60-cycle, induction machines.

The average load used in the estimated cost of electric service was based on the supposition that all machines not used during the day of test were operated at their maximum capacity for the entire time that the machines were in service, as the machines were only operating under a maximum load for approximately 50 per cent of the time that they were in operation. A large amount of saving was apparent in the estimated cost of electrical service.

The average load of 7.96 horsepower hours per day with 26 days' service per month was 1,240 kilowatt-hours and at 4.6 cents per kilowatt-hour the energy cost was $57.10 per month, to which was added oil at $1.50, so that the total yearly cost of electrical operation was $703, compared with $1,271 for steam. The estimated saving by the use of electricity was, therefore, $568 per year, and this led to the installation of the motor drive as indicated above.

The old steam plant was given additional advantages in determining the relative yearly cost of operation, and still electricity was shown to be preferable. Thus the electrical costs were figured upon a total operation of 312 days per year against an actual service by the old steam plant of 256 days. The average number of workman-hours with steam drive was 24.5 per day while with electricity this came to 36. The estimated cost of motors was $1,219 installed, the cost of placing the motors at the mill door being $1,080, material to be used in the installation work, $108 and the labor of wiring, $31.

The installation of the electric drive resulted in the elimination of the main shaft and three auxiliary lines of shafting besides cutting out 15 belts of varying length and sizes. The results of the first year's operation were as follows:

Total cost of energy	$419
Maximum bill for any month	$ 55
Maximum kilowatt-hours for any month	920
Minimum bill for any month	$ 33
Minimum kilowatt-hours for any month	220
Maximum demand	16.5 horsepower

In another plant, located near Chicago, the following conditions were found to obtain under existing steam operation:

	Yearly.
Service of engineer	$ 900
Fuel	1,280
Water	40
Oil, waste, etc.	60
Repairs to engine	100
Repairs to boiler	150
Total	$2,530

After thorough test of steam drive in this plant it was found that an installation of 130 horsepower in 10 motors would be ample. From operating test figures it was found that the average running load would be 40 horsepower, maximum. As the plant operated 9 hours per day, 26 days per month, the estimated consumption was 7,020 kilowatt-hours per month. At a rate of three cents the monthly bill therefore was $210.60 or $2,527.20 per year. This compared with steam operating costs show only a slight saving. However, the installation was made and the refuse which was previously burned is now sold and actually pays 60 per cent of the power bill. A considerable net saving is therefore apparent.

Logging.

The advantages of electric power over steam for use in the logging industry are so conspicuous that it is only a matter of a short time when all logging operations will be performed by electricity wherever it is possible to obtain the power. Every process in lumbering from felling the trees to turning out the finished lumber can be successfully performed by the aid of electricity, and in every case, as compared with steam, with greater safety, economy, and convenience, and with more rapid production.

With electric drive of logging machinery the necessity for steam is eliminated thus dispensing with the need of boilers, feed water, fuel and firemen. Expense items, such as boiler insurance, boiler care and repair, hauling feed water, cutting wood, and using good timber for it, etc., are saved.

But the most conspicuous advantage arising from the use of electric power in the lumber woods is safety from disastrous forest fires. It is freely admitted that 75 per cent of the fires in the lumber woods of the Northwest are caused by sparks from steam boilers. Millions of feet of valuable lumber are annually destroyed in this way. With electric power for the donkey engines this loss would be effectually prevented.

So far the Potlach Logging Company and the Smith-Powers Logging Company are alone in taking up logging with electric donkeys and the results so far obtained are only preliminary to the determination of the designs and requirements that will be necessary. Each of the electric logging donkeys consists practically of 11 by 13 Willamette yarding donkey, with 150 to 165 horsepower 3-phase, 60-cycle induction motor in place of the boiler and engine and with air-actuated frictions in place of steam, for which the compressed air is furnished by an electric-driven compressor. The replacement of the twin 11 by 13 inches by a motor of 150 or 165 horsepower, even after making allowance for the overload capacity of the motor when operating in bad ground or heavy timber, will bring out without question the use of larger motors.

The steam engines of 11 by 13 donkeys will probably indicate 600 horsepower and are capable of exerting all the speeds practicable and the same maximum pull on the hauling cable.

With the electric motors it is figured that they will be capable of exerting enough pull or torque at the start, when the torque or pull is maximum, to break any cable now in use, the amount of pull gradually decreasing until full speed of the motor is reached, when it will be between one-fourth and one-third of that at starting.

With heavy logging or bad ground this would necessitate the automatic slowing down of the electric motors and increasing the time required to haul the logs to the yard. Whereas, with the steam donkey, by control of the throttle, the engineer is capable of keeping up necessary or maximum pull on the cable at all speeds which the steam donkey is capable of.

The following figures from actual reports for a period of ten months, represent some of the labor and fuel expenses which can be eliminated by using electric donkeys.

Men-days	Camp No. 4	Camp No. 7	Camp No. 2
Firemen	1,259.50	212.50	1,167.50
Woodcutters	1,155	1,140.75	2.069
Fighting fire	92.25	661.75	300.25
Miscellaneous	732.75	516.75	907.50
Total	3,239.50	2,531.75	4,444.25
At $2.60	$ 8,420.00	$ 6,600.00	$11,550.00
Fuel	$12,600.00	12,364.00	12,740.00
Timber hauled, million feet	27	17	18
Labor per M. feet	$0.31	$0.39	$0.64
Fuel per M. feet	0.47	0.73	0.71
Total savings per M. ft. by the use of electric equipment	$0.78	$1.12	$1.35

The foregoing camp reports show the possibility of an average gross saving by electric logging of slightly over $1.00 per 1,000 feet or about $140,000 for 140,000,000 feet, the total logging operations in one year of the company furnishing the reports. On the other hand against this gross saving should be charged the cost of electric energy, which could probably be delivered in many logging camps for 1.5 cents per kilowatt-hour.

(Continued on page 493.)

Lumber-Mill Data—Sheet No. 1.

The term load-factor is used in these data in such a sense that a load-factor of 100 per cent represents the use for 24 hours every day of power corresponding to the rated capacity of the motors connected. An operating-time load-factor of 100 per cent represents the use of the rated capacity of the motors for the running hours per day specified for each installation.

Saw mill, located in northern Wisconsin. This plant saws hardwood logs into various sizes of timber. The output is from 20,000 to 40,000 feet of lumber per 10-hour day.

Total connected horsepower, 95. Total number of motors installed, 4. Average kilowatt-hours per month, 2,267.

Kilowatt-hour consumption for 9 months: June, 1,600; July, 2,470; August, 4,000; September, 3,710; October, 2,130; November, 2,300; December, 1,410; January 580; February, 2,210.

Load-factor, 4.3 per cent; operating-time load-factor, 12.4 per cent.

The electrical energy consumption per 1,000 feet of lumber is 3.5 kilowatt-hours.

Motor Installation.

The following is a list of the motors installed, with their respective drives. The supply source is three-phase, 60 cycles, 440 volts.

No.	power. Horse-	Speed R. P. M.	Application.
1	75	690	Slip-ring motor belted to a 10-foot shaft driving two Sinker Davis Company circular log saws, one 30-inch and one 48-inch saw, speed of saws 7,000 feet per minute; one traveling carriage for above saws driven by rack and pinion; one log haul, 60 feet long; one 20-foot chain conveyor; and one Gordon Grate Company 32-inch edger.
1	10	1,700	Squirrel-cage motor belted to shaft driving one Cordesman, Meyer & Company 30-inch by one-inch band saw; and one combination 18-inch saw bench.
1	5	1,700	Squirrel-cage motor belted to shaft driving one 24-inch swing cut-off saw; and one 20-foot chain conveyor.
1	5	1,700	Squirrel-cage motor belted to shaft driving a 20-inch swing cut-off

Lumber mill dealing principally in dressed lumber. Approximately 1,000,000 feet of lumber of various grades, are worked per month, while the maximum capacity is 1,700,000 feet. Operates 10 hours per day.

Total connected horsepower, 387.5. Total number of motors installed, 8. Average kilowatt-hours per month, 48,110.

Kilowatt-hour consumption for 12 months: April, 22,200; May, 45,480; June, 38,140; July, 52,710; August, 57,920; September, 44,840; October, 59,080; November, 54,440; December, 47,630; January, 45,540; February, 50,800; March, 58,540.

Load-factor, 22.7 per cent.

The electrical energy consumption per 1,000 feet of lumber worked is 48.1 kilowatt-hours.

Motor Installation.

The supply source is three-phase, 25 cycles, 440 volts. Motors are all of the squirrel-cage type.

No.	Horse-power.	Speed R. P. M.	Application.
1	150	480	Belted to a 70-foot shaft (16 hangers) and 32 feet of countershafting driving one Berlin 12-inch self-feed rip saw; one Berlin No. 94, 15-inch by 6-inch planer and matcher; one Homes 14-inch swing cut-off saw; one W. S. Sherman three-head end matcher; one Connell & Dengler 8-inch planer and matcher, one Connell & Dengler 10-inch planer and matcher; one Connell & Dengler 26-inch double surfacer; one Connell & Dengler 24-inch circular resaw; one S. A. Woods No. 24 planer and matcher; and one Buffalo No. 3 20-inch blower.
1	50	475	Flexibly connected to a Connell & Dengler 60-inch by 5-inch band re-saw.
1	50	720	Direct-connected to a Buffalo 60-inch steel-plate fan.
1	20	710	Belted to a 15-foot shaft (three hangers) and a 10-foot countershaft driving one H. B. Smith 6-inch, 4-side molder, 12-inch pulley; and one Greenlee Brothers self-feed rip saw, 22-inch maximum diameter saw used.
1	100	480	Belted to 60-foot shaft and 103 feet of countershaft driving four 12-inch swing cut-off saws; one 12-inch planer and matcher; one 14-inch planer and matcher; one 48-inch by 5-inch band resaw; one 14-inch swing cut-off saw; one Witherby No. 30 double-trim saw; one 12-inch double rip saw; two 30-inch steel-plate exhaust fans; and one 14-inch fan.
1	5	....	Belted direct to a 14-inch blower, 500 revolutions per minute.
1	7.5	710	Belted to a line shaft driving one 28-inch cut-off saw; and one 10-foot 45-degree conveyor to carry shavings from cyclone to baling press.
1	5	700	Belted to 25-foot line shaft driving one knife grinder; one 10-inch speed lathe; one double emery wheel; one 12-inch drill; and one band-saw stretcher.

Lumber-Mill Data—Sheet No. 2.

Wells Lumber Company, Menominee, Mich. This is a combination saw and planing mill manufacturing about 35,000 lineal feet of finished maple flooring daily. Sufficient refuse is burned to supply heat for dry kilns and winter heating, the remainder being sold. The revenue from the sale of this refuse pays about two-thirds of the power cost.

Total connected horsepower, 568.5. Number of motors, 36. Average kilowatt-hours per month, 40,554.

Kilowatt-hour consumption for 11 months: October, 25,800; November, 40,500; December, 46,500; January, 50,100; February, 29,400; March, 52,000; April, 39,700; May, 38,700; June, 39,300; July, 33,700; August, 50,400.

Load-factor, 13 per cent.

The electrical energy consumed per 1,000 lineal feet of flooring manufactured is 4.8 kilowatt-hours.

MOTOR INSTALLATION.

The following is a list of the motors installed with their respective drives. The supply source is three-phase, 60 cycles, 440 volts. Motors are of the squirrel-cage type unless otherwise specified.

No.	Horse-power.	Speed R. P. M.	Application.
1	15	1,120	Direct-connected to an Allington & Curtis 30-inch steel-plate exhaust fan.
1	40	1,700	Belted to an American 16-inch gang rip saw, has 10 saws on arbor, 3 or 4 saws are usually used at a cut.
1	10	850	Back-geared and connected by a chain to a 120-foot conveyor for bringing lumber from dock to live rolls for transferring to gang saw. Also drives a 130-foot chain conveyor.
1	15	1,700	Belted to a Mitts & Merrill No. 2 hog, 1,200 revolutions per minute, used for cutting scrap from gang saws to size suitable for handling by exhaust blower.
1	5	850	Belted to a 175-foot conveyor for carrying finished flooring from mill to storage house.
1	20	1,700	Slip-ring motor belted to a Prescott 22-inch, 16-saw slasher.
1	5	850	Backgeared and connected by a chain to a transfer table for above slasher.
1	10	850	Belted to an American No. 2 self-feed rip-saw. Saws from 16 inches to 20 inches diameter used.
2	3	1,120	Each direct-connected to American 12-inch inverted swing saw.
1	10	850	Motor has double extended shaft. One end back geared and belted to 25 live rolls, 30-foot bench. The other end is belted to two American 12-inch cut-off saws.
1	5	850	Belted to a 20-foot shaft (four hangers) and four 2-hanger countershafts, driving one American No. F-50 knife grinder, two 3-inch by 1-inch wheels; one American No. F-51 knife grinder, two 2-inch by 1.5-inch wheels; one 12-inch by 1.25-inch double emery grinder; one American universal grinder; one Hanchett size 3 automatic saw sharpener; one double emergy grinder.
1	75	490	Direct-connected to an Allington & Curtis 80-inch double. steel-plate fan. The blades are removed from one fan at present, however. This fan exhausts refuse from the end matchers and notchers mentioned later.
4	7.5	850	Each belted to two American 12-inch cut-off saw benches.
4	50	850	Slip-ring motor, each direct-connected to countershaft of an American No. 229, 9-inch by 6-inch, 4-side hardwood matcher.
1	10	850	Belted through friction drive to a 185-foot chain conveyor, 150 feet per minute, used to carry all refuse from the mill.
1	20	850	Belted to an American 30-inch scraper, 5 top and 4 bottom feed rolls, feeding 100 feet per minute.
1	3	1,700	Vertical motor belted to a Cadillac Iron Works 14-inch shaving hog. This hog is set in the exhaust from above scraper and cuts up shavings to size suitable for handling by the exhaust fan.
2	10	850	Each direct-connected to an American end-matcher, one matcher makes tongue and the other groove ends.
1	5	850	Back geared and connected by chain to four 12-inch belt conveyors, two 12 feet and two 50 feet long. These carry material from scrapers to end-matchers.
1	5	1,120	Belted to an American 12-inch cut-off saw.
1	7.5	850	Back geared and connected by a chain to a 6-chain transfer table which takes the material from matchers and cut-off saw benches to the scrapers, end-matchers, etc., motor also drives two 12-inch by 16-foot belt conveyors, one at each end of the transfer table.
1	15	1,120	Belted to a 6-foot shaft (three hangers), driving one Sherman end-matcher; one American 10-inch scraper, six feed rolls.
1	5	850	Back geared and chain connected to an 80-foot chain conveyor.
1	10	850	Belted to a 30-foot shaft (nine hangers) and 24 feet of countershafting (16 hangers), driving two New Haven Manufacturing Company 24-inch engine lathes; one Pound 20-inch by 6-foot planer; one 20-inch drill; one R. P. Howards & Sons bolt cutter and pipe threader; one 12-inch by 1-inch double emery grinder; one Armstrong & Blum 16-inch hack saw; one 24-inch engine lathe.
1	5	850	Belted to a friction-driven 8-inch by 78-foot chain conveyor.
1	10	850	Geared to a Fairbanks Morse 14-inch by 14-inch winch, used for pulling cars on the dock.
1	2	1,700	Belted to an O. L. Packard 37-inch band saw.
1	5	850	Belted to a 50-foot shaft (eight hangers) and 35 feet of countershafting (six hangers), driving one Covel No. 130 R band-saw sharpener; one No. 110 sharpener, 12-inch diameter wheel; one No. 130 L band-saw sharpener; two J. A. Barnes "diamond" circular-saw sharpeners; one Baldwin, Tuthill & Bolton band-saw straightener.

Energy is supplied by the Menominee and Marinette Light & Traction Company.

At the high rate, 14.1 kilowatt-hours per 1,000 feet, found in the tests herein described, which were made under very adverse conditions, the total energy consumption would be somewhat less than 2,000,000 kilowatt-hours for 140,000,000 feet. Care, repair, and operation of an electric donkey is necessarily considerably less than that of a steam donkey and its productive capacity from 25 to 30 per cent greater. Assuming, however, that these items are the same for electricity as for steam, the account favoring electric logging for the company whose report is considered is as follows:

Labor and expense of steam logging not required in electric logging, 140,000,000 feet at $1.00 per 1,000 feet	$140,000
Electric energy at 14.1 kilowatt-hours per 1,000 feet	19,750
Net annual saving by electric logging	$120,250

Other advantages favoring electric operation, such as increased continuity and rapidity of operation and decreased operation and maintenance cost, would have more than compensated for the cost of electric energy, leaving a clear saving in this instance of more than $140,000 on one season's work. Besides this is the elimination of the fire hazard which alone represents a vast saving.

Commercial Practice
Management, Rates, New Business

Apologies For Gas Lighting.

In the lighting field, as in other walks of life, the very act of apologizing implies that there are defects which need to be obscured or explained away.

That there are such in gas lighting and that these count in competing with electricity, is an old story and it is only natural that those interested in the sale of gas should encourage each other by suggesting lines of talk for glossing over these shortcomings. Sometimes these arguments tell more between the lines than their advocates intended and when this happens in the case of gas lighting, those interested in the sale of current may well take note.

A fine instance of such apologetic arguing was found in the paper read before the recent annual meeting of the Wisconsin Gas Association at Milwaukee by C. H. Wiggers of the local gas company. Says Mr. Wiggers:

"The arguments which our electric competitor uses against gas lighting are: the heat in warm weather, the discoloration of the ceiling, and the lack of convenience in lighting and extinguishing the same. While it is true that a gas unit radiates about three times as much heat as an electric unit of equivalent candlepower, it is only in warm weather that the heat might be objectionable; but then the hours are very short, and the consumer usually has all his windows, doors and transoms open in order to get a circulation of fresh air."

But how about the darker parts of stores and shops where the lighting hours cannot be so short even in summer? How about the windy days when the whirling of dust along the streets will not allow windows to be opened freely without spoiling the contents of the stores or rooms, nor without causing a heavy breakage of globes, chimneys and mantles? Besides, in how many establishments are the lights so placed that an excess of heat from the same will not be objectionable also in cooler weather? To avoid causing discomfort, they should be placed in positions logical for heating elements, and who would seriously think of placing a heater of any kind up on a lighting fixture? When the cooler days come, it is the feet, knees and hands, but not the head that demand the added warmth.

Mr. Wiggers continues: "Moreover, the heat from gas light is beneficial, if it compels the occupant of a room to ventilate it in order to get rid of the heat, whereas the poor ventilation might not be noticed but for the heat."

If this logic is proper, a smoky kerosene lamp might be still better—indeed, any despoiler of the air in a room could be justified by the same course of reasoning. But would it not be far more simple and more logical to leave the larger percentage of oxygen and of fresh air in the room, thereby avoiding the necessity of the extra ventilation which the poorer illuminant demands and which is not always easily obtained with existing building constructions?

As to the discoloration of ceilings, Mr. Wiggers is quite frank when he says: "Let us concede the fact that gas will do more damage to a ceiling than electric light. * * * With electric light, the consumer will have to redecorate once in four years, and if using gas, once in three years." But where does he find the gas-lighted rooms in which the ceilings will still be presentable after even two years?

Coming to the convenience of lighting and extinguishing gas, he held that "it is no more trouble to go to the center of a room and pull a chain on a lamp than it is to go across a room to push a button." Those who have stumbled over chairs and bumped their shins while groping for fixtures may find some theoretical comfort in this assurance. But will it be believed by those who have grown accustomed to the convenience of wall switches?

Evidently, the gas manager's apologies of 1912 are very, very like those of five or ten years ago. They practically answer themselves and imply that the wide-awake electrical contract agent has little fear from the gas competition except on the question of price—the invariable advantage claimed for all inferior commodities.

New Office for Kentucky Electric Company.

The Kentucky Electric Company, of Louisville, Ky., will probably gain occupancy of its new headquarters on Fourth Avenue by October 1. The big building now being erected on the site is near completion. It is especially designed for headquarters for the electric company, being erected of dark mottled brick, concrete and steel, with a front that is practically entirely of glass.

The move of the Gateway City central station in securing these offices is noteworthy. The Kentucky Electric Company has decided that it must reach the public in the heart of the city, and that is where the handsome new structure is located. A square from the central point in the shopping district, facing the busiest thoroughfare in down-town Louisville, the location should be eminently effective in preaching the gospel of electricity to tens of thousands of possible consumers passing daily and nightly.

The Pacific Gas & Electric Company has announced a reduction in electric current in Berkeley, Cal., for commercial purposes from seven cents to five cents per kilowatt-hour and from five cents to three cents per kilowatt-hour for power purposes.

Central Stations and the Laundry.

As laundries are fast becoming one of the foremost examples of electrification—electric light, heat and power being the keynote of the business—one would naturally expect to find a close relationship existing with the central station or electric power company—yet the very contrary is the condition; not only does no relationship exist, but the feeling of the laundry towards the central station is decidedly antagonistic.

This feeling is not the mild antipathy felt by a majority against public-service corporations as a class but is a very real and active one against misrepresentation—not imaginary but tested—not theoretical but practical—with loss and gain accounts as evidence and proof.

No sympathy or allowance is due the central stations, but they are entitled to the explanation of misunderstanding the conditions; this may explain, but hardly excuses misrepresentation. No argument can be universal in applicability and any endeavor, wilful or ignorant, to use conclusions arrived at in one kind of manufacture by applying them indiscriminately to others must be erroneous and expensive to the credulous, although innocent, customer. A laundry is not a printing plant or a machine shop. It has certain processes peculiarly its own. Its power conditions are almost unique, and the central-station contract department confining itself only to comparative costs of power generation has been a very misleading advisor.

The policy followed by central stations, of course, varies very materially with location and controlling interests. The south and west particularly have in a relative degree reason to congratulate themselves as compared with eastern conditions. But irrespective of policy followed, liberal or otherwise, arbitrary or diplomatic, the main irritant between the laundry and the central station has been and is the misinformation used in an endeavor to sell power.

Laundry processes use steam and then some more steam and some power. Where steam necessities are the prominent factor power can be rightly regarded as a by-product to a greater or less degree valuable, depending on condition purely local to each plant.

The blatant statements scattered broadcast and seemingly comprising the entire sales ammunition of many central-station solicitors, all hang on the admitted assumption that a large central station can generate current more cheaply than a small isolated plant. Processes of manufacture and individual conditions have received no recognition and many times, until it has learned better and discontinued the exclusive use of central-station service, the laundry exchanges a valuable by-product for a considerable monthly expense. The central stations have wanted the laundry business badly enough to spend considerable soliciting it, but not badly enough to spend one cent studying conditions—contracts without commensurate service. The laundry has needed central-station service badly enough for individuals to believe representations without investigations and tests. The central station has in return for their effort made little or no return, and the laundry has paid plenty to learn to distrust statements made; and absurd as it may seem, these are the conditions which exist between two parties, one presumably with current to sell and the other with not only a desire but almost with the necessity to become a purchaser for a portion of current used.

The electric laundry needs considerable current. Part of this it can better and more cheaply (because of steam conditions) generate, and the remainder it wishes to purchase and yet no business results because the central station will seemingly have it all or will furnish none. It will not demonstrate or prove the correctness of its statements—the laundryman must take all the chances. The laundry feels the injustice, remembers it on every occasion and installs sufficient generator capacity to fill its requirements and the central stations get business from a few of the laundries instead of from many plants. Many thousands of dollars a year of business is available to the central station from the laundry (not only available but asking to be taken) and all the central station has to do is not to be generous or liberal—simply fair in soliciting, advice given and in handling. The laundry needs this current for overtime, for nights, for sign lighting; and needs the possibility, in event of accident to its own generator, of drawing city current to run the plant pending repair—and the central station responds with, not a request but a demand for a guaranteed annual consumption based on the total load of every motor, every heater, every bleacher and lamp in the plant.

The laundryman purchases another generator and forgets the central station except when opportunity offers to retaliate for what he feels as an attempted gross injustice. Noteworthy exceptions exist and we believe when exercised the income has been all the local central station hoped for and a great deal more than expected.

It is true that every time the central station looks back even ten years it feels astounded at its present generosity, but it is much more true that the present management would be horror stricken could they only look ahead ten years—considerable acceleration will be given this movement, as all efforts of the trade are being united to bring about some better relationship with the central stations as a better understanding must be mutually advantageous; but under existing conditions, excepting the exceptional cases, the laundry cannot afford to do business with the central station and the central station has done little towards earning recognition or consideration. Inasmuch, however, as the laundry needs the current and the central station is absolute, the remedy can only be to endeavor to placate the central station by showing benefits to be obtained by change of policy; and any results obtained will be of benefit to the laundry and also it would seem to the central station.

Individual effort is easily applicable. Each laundry owner approached by central-station solicitors has it in his power to benefit the entire industry, and therefore sooner or later himself. An explanation of laundry conditions will start the central station investigating. They will begin to consider particular, instead of general conditions, and again if the central stations advise the use of their service as being more economical than isolated plants, they should be willing to demonstrate, to install their service for test periods, due accounting being made of coal, etc., used before and during the time their current only was being used. A very large number of laundries have all facilities for a test of this nature.

If any station can be convinced of the errors of its assumptions or statements, much has been accomplished and done toward the establishment of the relationship which should exist between central stations and the laundry.—*Starchroom.*

Listing Vacant Houses.

As it is to the interest of the central station to have wired houses occupied continuously, it seems that some effort on the part of the company to assist landlords in renting such houses when vacant would be in order. In a small Northern Michigan town, the electric company provides a bulletin board, occupying a conspicuous location in the office, upon which all wired houses are listed, such information as number of rooms, rental, location of keys, etc., being given. Landlords of wired houses are invited to notify the company when a house becomes vacant and assist in keeping the bulletin board up-to-date. The scheme has been instrumental in influencing owners to wire their houses, as well as in assisting in the rental of vacant houses.

Electrical Construction

THE WIRING OF OLD HOUSES.[1]

By Howard H. Wood.

Before proceeding with a description of the methods used in the wiring of already built houses, it would be well to outline some of the conditions under which the work is done in the city of Pittsburgh. Although the National Board of Fire Underwriters' rules are generally followed throughout Pennsylvania, yet in some of the cities, especially those having their own inspection bureaus, these rules are supplemented by additional rules that are a considerable factor in determining the number of houses available as wiring prospects; this on account of the higher cost of wiring made necessary by these supplementary rules.

In Pittsburgh, the National Board rules apply, but the City Bureau of Electricity has added other rules, the following being most important in their effect in raising the cost of wiring:

(1) Each room must have an independent switch located at the most used entrance to the room.

(2) Where there is a gas outlet, switch must be double-pole. Most houses in Pittsburgh are piped for gas.

(3) Mains must not be smaller than No. 8 B. & S. gauge.

(4) Circuits must not be smaller than No. 12 B. & S. gauge.

(5) Higher cost of inspection over Allegheny County Board of Fire Underwriters' rules.

Estimating.

When a request for an estimate reaches the office of the wiring department, all the particulars which can be ascertained over the telephone, or verbally, are entered on the first page of an estimate sheet, which sheet is made in the shape of a folder containing four pages; on the first page is entered the name and address of the owner, tenant, or agent, telephone number, name of the person requesting the estimate, name of the clerk receiving the same, ward and date on which it was received.

The sheet is then given to the estimator, who, when on the premises, gets the information as follows: the kind of house, kind of wiring, number of circuits, where tablet board or meter is to be placed, where mains enter building, location of nearest company pole, the number of the pole; also the approximate distance to pole, and whether the service will be underground or overhead.

The above information occupies the top part of the estimate sheet, and the lower part of first page is used for the estimate proper. This part is arranged so that the estimator can specify floor, name of room, ceiling height, size of room, kind of wall, floor or ceiling, kind of outlet, number and kind of fixture, and number and kind of switch; the lower part of the page can be used either for the price-per-room plan, or for the regular material-and-labor estimate.

Although the price-per-room plan is not advertised, it is used on all ordinary houses to save the estimator's time in figuring up the material and the labor necessary to a complete job.

When an especially large or difficult house is encountered, or in the case of a commercial or power estimate, and on repair and extension work, the material and labor are always figured, then the list of material is placed on first page, and a detailed description of what is to be done is given on second page.

In either case, when the estimator has prepared the estimate, the sheet is returned to the office, where the price is placed on it, and the sheet is filed in a box file, designated "Waiting on Customer's Decision."

The typewritten proposition, along with the work order, or a lease agreement form is then sent to the contracting department for its record of the prospects, and for the solicitor in the proper district to deliver to the customer.

When signed, the wiring order, or lease agreement, is returned to the wiring-department office. The estimate sheet is then taken from the temporary file, and when the prospective customer's credit is found to be all right, papers are placed in the work drawer.

Any reliable contractor has the privilege of looking over the estimate sheets on hand, and, if satisfied with the price, the contract is given to him and a confirming order sent him to proceed with the work. The company pays him in thirty days, and collects from the customer in thirty days, or in twelve months, according to the agreement made when the order was signed. The contractor also has the privilege (when his prospect is for the wiring of an old house) of offering time payments to his customer; the order is then confirmed to him, and the account handled through the company.

The estimators employed by the Allegheny County Light Company are experienced wiremen, and can get on an average ten estimates each per day. In addition to the estimating on the wiring of old houses, they secure estimates on commercial and power wiring, and on repairs and additions to the existing equipment.

In addition to the estimators employed by the wiring department, all the company solicitors are furnished with a loose-leaf booklet, which contains all the necessary information based on the price-per-room plan, to enable them to estimate on any ordinary house, and close the transaction with the customer on the spot.

The two other pages on the estimate sheet are taken up with the wireman's report on the work, requisition number on which the material is secured from the storeroom, city-permit number, date on which work was completed, time district superintendent was notified to connect, record of reclaimed material, and record of costs, etc.; in fact, the sheet is a record of the job from the beginning to the end, and is filed in a book file, alphabetically, and according to the month.

Fig. 1 shows the routes taken by the wires, to chandeliers and switches, within walls and under floors for a typical five-room house. The point of entry for the mains in this case is the kitchen, on whose outer wall is located the main switch, the fuse block, and the meter. The connected load being less than 660 watts, or twelve (12) lamp outlets, only one circuit is necessary. The fixtures being combination gas and electric, double-pole-switch wiring is required, as shown in the illustrations.

Fig. 2 shows the location of switches and outlets on first floor. The dotted lines in this figure show the distance between the flooring boards taken up

1 Paper presented at convention of Pennsylvania Electric Association, slightly abridged.

on the second floor, and the fixture and switch locations on the first floor, the switch locations especially being within easy fishing distance.

Fig. 3 shows the flooring boards removed on second floor in such a location as to pass under one partition only, and with regard to accessibility of the outlet and switch openings below.

In many houses of this kind, the space between roof and second-floor ceiling is sealed, in which case a hole is cut in the ceiling of a closet, and the opening is provided with a trap door.

In the laying out of old-house wiring propositions, one of the first things to be considered is the location of the meter, the tablet board, and the point where the wires are to enter. The estimator is requested to arrange for locating the meter loop in either the kitchen, pantry or cellar; in the smaller houses, that the tablet board be located near meter, and in the larger houses, where there are a number of circuits, at the central point of distribution, that is, at some point on the second floor, preferably the hall. He is also instructed to locate the point of entry with reference to accessibility of the service connection.

Removing Flooring Boards.

First a slot must be made in the seam between flooring boards of sufficient size to enable the floor saw blade to be inserted. This is best done with a sharp, narrow, chisel having a five-eighth-inch blade; then the saw blade is inserted, and the tongue at the intersection of the flooring boards is sawed off the full length of board to be removed. The wireman can tell when he reaches the joist at which he wishes to end his cut. At this point the chisel blade is turned the opposite way, that is, with the flat part across the board at the edge of the joist, and another small slot made, then the board is sawed off even with the joist, and can easily be removed with the help of a floor chisel. When the board is replaced, a cleat is nailed to joist for the board to rest on, and is then nailed down, or better yet, screwed down, so that, if it is necessary to get at the wires again, it can be done with little trouble. Also, when fastening down the flooring two nails or screws should be put in each joist; when only one nail is used, the board is liable to squeak when walked over.

Wiring for Switch Loops.

In a great many cases, the locating of the switch loops at a proper distance from floor is the hardest part of wiring old houses, on account of the cross pieces sometimes found in the partition. The method used must be determined by the wireman on the job, according to the conditions found. Following are some of the methods used:

First, he takes his mouse, and finds if the runway is clear; if so, the rest is easy. But, if he finds there are cross pieces, he locates their position by measurement with the mouse, and marks the location on the wall. If the cross pieces are above the proper positions for the switch, he will probably use one of the following methods of getting around it:

(*a*) Remove the door-stop strip from the frame of the door-way, bore through on each side of the cross piece, and cut a recess in the inside of the frame, then fish the wires around.

(*b*) If on the second floor, and there is no partition directly above, the wireman can use a pipe extension bit, drilling one hole large enough to fish the switch loop through.

(*c*) If the cross piece is not too far above the proposed location of the switch, holes can be drilled on a slant from switch opening.

(*d*) Removing wall paper directly over the cross piece, which can easily be done, especially in an old house where there are several thicknesses of paper, either dry or by dampening the same, cutting X shape and bending the paper back, but taking care not to bend enough to crease. Then cutting a hole smaller than the paper removed, and boring holes or cutting away the cross piece enough so that the wires will pass. If there is a figure or flower where the cross piece is located, the same can be cut out with a sharp knife, and after the hole is plastered up with plaster of paris, the paper can be replaced very neatly. A careful man usually performs this operation very successfully.

Sometimes a wireman will attempt to remove these cross pieces, when he can get at them from above, by putting a piece of pipe down between the partition, and hitting with a heavy hammer. This method is liable to cause damage to the plaster by bulging or breaking it out, and is not recommended.

When a switch must be located on a brick wall, it is necessary to run wires in rigid or flexible steel conduit. The wall must be channeled, and the conductor buried in the same, and the groove replastered. At the point where the metal terminates under floor, a suitable outlet fitting must be provided.

Fishing to Center Outlets.

A great deal depends on the layout of the house in regard to the best method of installing center outlets; almost invariably the joists are run parallel to the street. If the house is one with a side or center hall on the second floor, the circuits can be run the length of the hall, necessitating the removal of two boards for that distance. Wires can then be fished from the center of the room by cutting a small hole at the chandelier location, or by cutting a pocket in the floor directly above the location of the outlet. If it is necessary to take up the boards in the floor at some distance from the partitions, another pocket will have to be taken up close to the partition in order to drop the switch loops, and to go through to the other side. This is necessary when the hall is in the center, with the rooms to be wired on each side.

If, as is the case with some of the smaller houses, there is no hall on the second floor, and the rooms are directly in the rear of each other, the boards can be taken up through the doorways, and the wires dropped to the switches, outlets and to the tablet board in the kitchen very easily. (See Figs. 1, 2 and 3.) Where there are hardwood floors, the wires must be fished from the center of the room to a closet, or to a point where the base board can be removed, so as to get into a partition going either up or

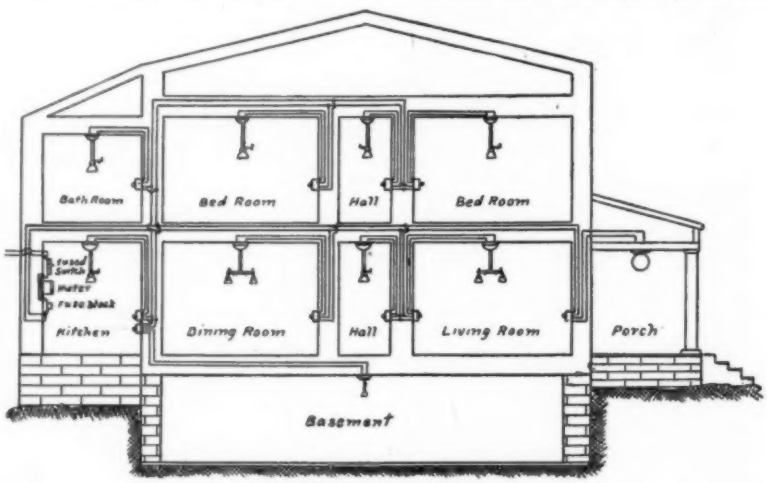


Fig. 1.—Section of Building.

down. It can readily be seen how, in Pittsburgh, the rule requiring double-pole switches at the entrance to each room would complicate the wiring of a house in which there are hardwood floors on the second floor. In a great many cases, it is necessary to drop to the cellar, and then come up again in another location for the switch loop. In this case, the most convenient place for the tablet board is in the cellar.

All material returned is taken care of by the stock and repair man, whose duty it is to get all material in shape to reclaim, into the storeroom, making any repairs necessary to this end. On material which cannot be reclaimed, such as pieces of wire, loom, metal conductor, of reasonable length, he places a tag, specifying the length and the kind. As the estimate sheets pass through his hands on their way to the

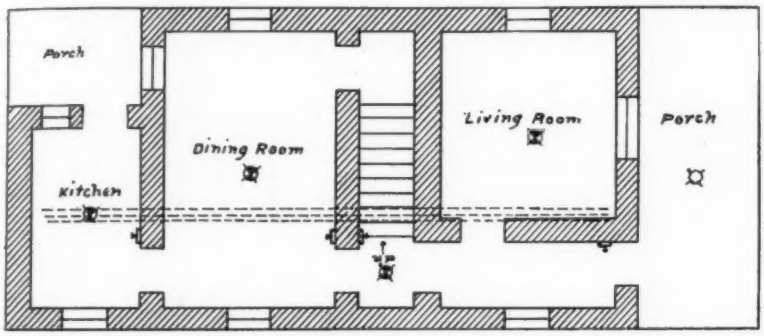


Fig. 2.—First-Floor Plan.

When plaster of paris molding or center pieces are to be drilled, we have found the Syracuse bit to be the best. In many cases it is necessary to first saw off the lower portion of the center decoration to provide a flat surface to front the drill. Use very little pressure, and have the drill as sharp as possible.

Handling of Material.

All material used by the wiring department is furnished by the general storekeeper through a sub-storeroom work drawer, he places a check mark after any material which can be used from his stock, so these items are not included in the requisition when it is made up. In this manner, all material which is not actually scrap, is used up.

In closing this paper, I should like to mention one rule which the company takes considerable pains to impress upon its wiremen. This is, that, during the progress of wiring an old house, the work must be carried on in such a manner as to cause the least in-

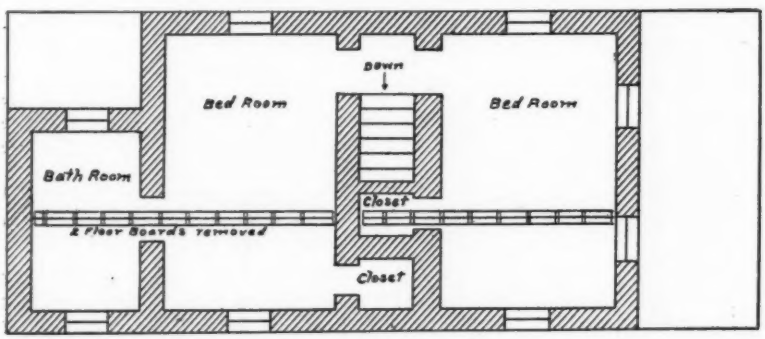


Fig. 3.—Second-Floor Plan.

located in the same building as the wiring department. In this storeroom is kept a full line of everything pertaining to the wiring business. It is issued on requisition made out by a special clerk. On most jobs the material is delivered by an auto truck, and the wireman is furnished with a pick-up slip, which when the job is completed is turned into office with his report. On the slip he enumerates any material or tools left on the job, which are to be picked up by the truck as soon as possible thereafter.

convenience to the customer. As soon as they are through in one room, to remove all traces of dirt, and replace furniture and carpets as found. This is especially appreciated by the ladies of the household, whose approval often results in the securing of other contracts in the same neighborhood.

The production of copper in California in 1911 was 36,316,136 pounds, valued at $4,539,517, a decrease of 12,384,620 pounds in quantity and of $1,645,479 in value from the previous year.

ELECTRIC LIGHTING FOR FARMS.

By E. M. Raetz.

While electric lighting for farms is a comparatively new thing, its safety and convenience are bound to bring it into immediate popularity among that class of farmers who consider these requisites of any importance in any article they buy, or any improvement they make about the farm, also their own comfort. This is especially true of farmers and their wives who are getting along in years, when they appreciate these comforts.

The following is an account of a plant installed on a farm in Olmsted County, Minn., and is interesting inasmuch as it is one of the first to be installed in that section. Heretofore, electric lighting for a farm or any isolated country place has usually suggested an outlay of several hundred dollars in a big, expensive storage battery and it took experts to set this up and keep it in operation, and the cost of this equipment has been entirely out of the reach of the man of ordinary means.

But improvements in lamps and in other parts of the system have been made, so that now a much smaller battery is needed, and this is put up in portable form, which makes it easy to ship and handle; and automatic regulators are made so that charging the battery is done with a small amount of attention, as these devices take care of the current and automatically shut it off when the battery is fully charged.

The plant to be described is on a typical group of farm buildings: The house has twelve rooms. The wiring of farm houses is a comparatively simple matter as the upstairs floor is usually laid with wide boards which can be readily taken up and the wires concealed between the flooring and the ceiling of the first floor. The house in question had gas fixtures; these were insulated, the arms were turned so that the lamps pointed downward and were wired and fitted with proper shades; so it made a first class electric fixture. A switch was wired for each room, and for the second-floor hall lamp, a three-way switch was provided so that the light could be turned on or off from the first or second floor. All the rooms had fixtures, the porch was wired, the cellar lamp was placed so it lighted the stairway well, and an outlet was left for the electric washing machine in the kitchen.

The barn, with horse and cow stable beneath it, was about 300 feet from the house and a line was strung on trees to it; five lamps were wired in the barn, each on a separate circuit at the most convenient point.

The dynamo, gasoline engine and battery are located in a small separate building near the house. The dynamo has a capacity of one kilowatt and is driven by a two-horsepower gasoline engine. The battery is of 100 ampere-hour capacity and there are fifteen cells, the system operating at thirty volts. The wire running to the barn is No. 8 B. & S. gauge and is found to be large enough, there being no noticeable drop in voltage at the barn. Altogether there are twenty-five lamps connected to this plant and during the first two weeks in April, it required but six hours' charging daily. To completely recharge the battery when empty requires about eight hours, continuous running.

The cost of this installation was $275 for the dynamo, battery, switchboard and lamps, and $103 for the wiring and installing complete, which would make the cost compare favorably with the acetylene and other forms of lighting and electric equipment allows the use of electric washing machines and fans.

There are two types of storage batteries manufactured, the pasted plate and the formed or Planté type of plate. The former is cheaper than the latter and will last from 150 to 200 complete discharges, which in actual practice will be from three to five years, after which the positive plates will have to be replaced. The Planté type costs considerably more, but will last for from 1,500 to 2,000 complete discharges, which in actual practice would be from ten to twenty years, assuming in each case a complete discharge occurring once in about two weeks.

In the above case, the life of the pasted plate was considered sufficient, as under the conditions under which this battery is working there would be about twenty-five discharges a year, in which case its life would be eight years, assuming that the battery was properly handled during that period. After that time, the cost of renewing the positive plates is about $30, then the battery will be good for another eight years. This brings the cost of up-keep down to a very reasonable figure, and it is only advisable to use the Planté plate where the size and demand on the plant will warrant the outlay—in other words, where the requirements are more severe than on such a plant as above described. It is necessary to keep the battery in an even temperature to secure the best working results.

It is also desirable to get an engine plenty large enough for the generator; most engines do not seem to be rated correctly and good practice would be to allow two horsepower of engine capacity to one kilowatt of generator capacity in these small units.

A NOTE ON BENDING CONDUIT.

By Henry Fleishman.

I read an article not long ago on bending small conduit in a conduit-bending machine. Where I work, we use a pipe bender of the kind shown in Fig. 1 frequently, and when the same bend is wanted in a number of pieces of pipe we proceed in the manner indicated in the figure. A mark is made on the piece of pipe where the bend is to begin, and this is brought to another mark on the bending machine itself. Then the pipe is bent until it touches the bender at the left-hand mark on the machine, this left-hand mark having been laid off so that stopping the bend here would give the pipe the proper curve. Where a number of conduits run side by side into a fuse cabinet as in Fig. 2, and in other similar cases as well, it is very desirable to follow some such practice as this in making any necessary bends. It insures a neat looking job.

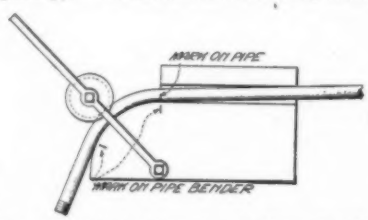


Fig. 1.—Method of Securing Uniform Bends.

I wish also to let other electricians know how handy a device we use for bending large pipes—that is, pipes from one inch in diameter up to any of the larger sizes. Through a piece of timber 10-by-10 inches in cross-section, or larger, we bore a hole slanting upwards and in such a position that when the timber is fastened in the corner of a beam and at the ground the hole is just high enough for a man to put pipe into it conveniently. We make this hole sufficiently large to take the biggest pipe on the job, and in making sharp bends in smaller tubes it is only necessary to put a small block or wedge under the tube in the hole. The device is illustrated in Fig. 3.

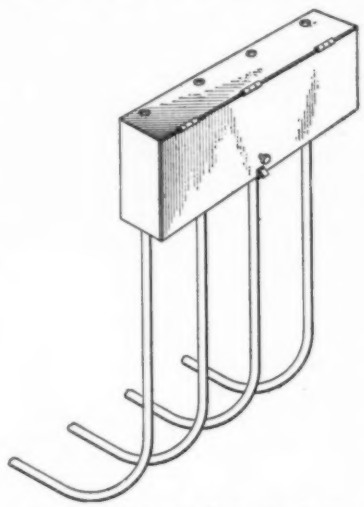


Fig. 2.—Showing Uniform Bends in Conduits.

It only takes two men to bend pipe in the timber; for when a large pipe is to be bent a piece of a still larger one can be slipped over it to furnish the necessary leverage. The timber can be kept for all big jobs on which much large pipe is to be bent. The use of it does away with the bull-ring, with all its blocking, which must be changed every time a different bend is wanted. It also does away with the danger arising from the liability of a bull-ring breaking. I have seen these break with very disastrous effects.

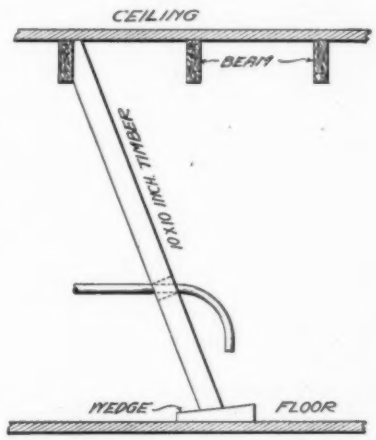


Fig. 3.—Arrangement for Bending Large Pipes.

Full elbows can be made in the timber by first getting a good sweep on one side, and then going to the back of the block and bending the other end of the pipe.

The Faraday Electrical Association.

About eighteen months ago a few of the Chicago contractors, who resided and carried on the largest portion of their business in a district known as the North Side, decided that the contracting business as it stood bore no resemblance to a bed of roses, regardless of the fact that it was really one of the most important branches of the building industry. They viewed the conditions from every conceivable angle and the diagnosis revealed the fact that the trouble was due to the practices of those so engaged.

The ten men who are included in the accompanying photograph as charter members of the Association decided that a united and systematic treatment of conditions was the only

way in which they could expect to improve the business, and, with this idea in mind, they formed a club which was then known as the Faraday Club, held meetings each week and discussed the best means possible to bring about the desired results. The results of their efforts were apparent from the start.

The knowledge of the Club's existence soon spread to the most remote corners of the city, where the conditions that caused its existence were keenly felt, and, although the original members had no thought of extending its operations outside of their own locality, the persistent and continual requests from other parts of the city prompted them to extend their organization over the whole city.

Some idea of the importance which was attached to the so-called Club can be realized from the fact that at the end of three months the membership increased to 52 and in the succeeding three months to 65.

Most of the energy up to this time had been put forth in gaining knowledge of the conditions as they existed and in rendering what little assistance the individual members could. It was then found necessary to establish permanent headquarters and to place in charge a secretary who would devote his entire time to association work. W. J. Collins was selected to take charge of this work, and has found that it is quite enough to occupy the attention of one man.

From this time on the work of the Association has been along the lines of education and in establishing a more friendly feeling among the men engaged in this line of work. It has been very successful along the educational line, inasmuch as members have been induced to operate their business in a systematic way. They know what it costs to do business and that they are entitled to a profit for their efforts and that unless they get this profit they will be doing something else next year. They know too, that unless they respect the rights of competitors, they cannot expect the competitors to respect theirs.

In carrying on this work they have found considerable opposition expressed by different interests with whom they are associated, such as architects, general contractors and builders, who found that lying and inciting ill-feeling among competitors for the purpose of creating and fostering cut-throat competition could not be carried on as among a disorganized body of contractors.

The members of the Faraday Association have come to the conclusion that they need the support of the public in their work, and, in order to get this desired support, realize that they must give it cause to recognize their work, give it something that cannot be had outside of the organization, and, in realization of this fact, are at present working on a plan to guarantee the work of the members, insure prompt attention and to quote prices that will insure good work and encourage the further use of current, protect customers by carrying annual insurance policies against injury to workmen and public. This last feature is now adhered to by all of the members and is a matter that should be of special interest to customers, as the workingmen's liability law, effective in Illinois, holds the owner of the building where any accident occurred as a co-partner with the contractor and thereby subject to all or part of the liability in case of accident; and a judgment for any injury applies as a first lien

Charter Members of Faraday Electrical Association.

From left to right, standing: J. Johnson, Richard Weber, R. C. Bierdemann, Samuel Benson, J. Bond, F. L. Decker.
Sitting: Andy Olson, Oscar Brandt, J. Arbogast, Carl Neuman.

against the property and cannot be waived until the judgment is satisfied.

The success of this venture is in no small degree due to the untiring efforts and ability of its first officers, R. C. Bierdemann as president and F. L. Decker as secretary and treasurer. Mr. Bierdemann retired from the office of president at the last annual election, which was held March 1, against the wishes and desires of the membership. Mr. Decker was re-elected to the office of secretary and treasurer by a unanimous vote of the membership and is rendering valuable assistance in the work as now carried on.

J. P. Kerns, the present president, is a man of unlimited ability, well versed in all branches of the industry, having spent the greater portion of his life in the business, starting as a water boy for a pole-line crew and rapidly advancing in knowledge of the work. He later took up interior wiring in Chicago as a journeyman electrician and was infused with the idea that he was worth more to himself than to his employer, and, with this idea in mind, entered the contracting field, meeting with success from the very start. Mr. Kerns is a member of several fraternal and social organizations.

Inspection and Licenses in Lynchburg.

The municipal regulations in Lynchburg, Va., which is a city of about 40,000 inhabitants, have several features of special interest, some of which some of the largest cities might study with profit, it would seem. In connection with electrical inspection here there is the usual order of procedure, with the very important exception that no fee whatever is charged. A written permit must be obtained from the city electrician before any wiring is installed in a building or any changes or alterations made in work already approved and in service, and the local central station will not connect its service to any installation until a properly signed certificate of final inspection and approval has been received from the city electrician. Like the inspection proper, all permits and certificates are free.

W. L. Kent is city electrician. There is very close co-operation between him and the electrical inspectors for the South Eastern Tariff Association, in whose territory Lynchburg happens to be. When the inspectors for this association discover defective wiring within the city the property owner is promptly notified, and when the necessary corrections have been made Mr. Kent is expected to notify the Association of that fact, this notification being held as proof of the fact until it is convenient for the Association to make another inspection.

In Lynchburg Code rules, without changes or additions, govern all electrical construction. As a means of promoting good wiring, all electrical contractors are required to file a bond of $3,000 with the city, which bond may be forfeited in case the contractor does poor work or refuses to make corrections recommended by the city electrician. Before the bond is accepted, however, either the contractor himself or the foreman who is to have charge of the work on his contracts, must pass an examination conducted by the city electrician for the purpose of making sure that the applicant is a practical, experienced electrician. When the examination has been passed, a license is awarded the applicant, a fee of $15.00 being required for this.

The Lynchburg Traction and Light Company, which furnishes all electric power used within the town, does no inside wiring at all.

Among the Contractors.

The Hatfield Electrical Company has secured the contract for wiring in the two new units at the City Hospital, Indianapolis, Ind.

G. D. Cammack Electric Company has secured the contract for electrical work on the new Hippodrome Building, Dallas, Tex.

Buff City Electrical Company, Alton, Ill., has been awarded the contracts for the electrical work in the Horace Mann School and the Upper Alton and Lowell School, Alton.

The James Clark, Jr., Electric Company, of Louisville, Ky., has recently installed the motor equipment for Wuest Brothers, machine builders, Louisville, Ky., and has also recently been awarded the contract for installing two generators of considerable capacity upon the handsome steamer which is being built by the Howard Ship Yards & Dock Company, of Jeffersonville, Ind.

G. A. Siever, of Jacksonville, has received the contract for the electrical installation at the new girls' cottage of the Odd Fellows Orphans' Home in Lincoln, Ill.

The Richardson Electric Company reports a very satisfactory business in Duluth, Minn., for the summer. It has lately secured the wiring for about 700 horsepower in motors, and for all of the lighting in the plant of the American Milling Company, in Superior, Wis., and also the wiring in the substation, in connection with same. The current used is three-phase, stepped down from 13,200 to 44 volts, 25 cycles.

In addition to this, a contract has been secured from the Great Northern Power Company, at Duluth, for rewiring for 35 motors in the Patrick Woolen Mills, one of the important industrial plants at the head of the lakes.

The Hudson-Morgan Electric Company, 624 Main Street, Lynchburg, Va., is wiring the new postoffice building now being erected in Lynchburg.

The Carroll Electric Company, of Washington, D. C., has been awarded the contract to install the electrical work in the new Virginia Hotel at Lynchburg, Va.

W. L. Rigsbee, electrical contractor, of Chapel Hill, N. C., is just completing the wiring in the new medical building and in three new dormitory buildings for the University of North Carolina, at Chapel Hill. These are all modern, fireproof buildings and the wiring is all concealed conduit work, with underground service connections from the overhead lighting mains.

The Central Electric Company, of Greensboro, N. C., has recently completed the wiring of some large dormitory buildings for the Greensboro Female College and for Guilford College, near Greensboro.

Gus Albrecht, of Albrecht and Heick, well known electrical contractors and supply men in Louisville, Ky., has left on a vacation trip through the East.

Apartment-house work is pressing so upon the Home Electric Company, of Louisville, Ky., that, in the report of the company, it was estimated that ten cents per day must be added to overhead expenses for wilted collars. The company, which has been made famous through its slogan "Let-Us-Y-R-4-U", is wiring the Reeser Apartments and the Brown Apartments in conduit.

The Marine Electric Company, of Louisville, Ky., added some fine contracts during the first week of September. The company is installing individual telephone equipment, iron-conduit wiring, etc., in the Realty Apartments, Fourth and Breckinridge Streets. It is also placing conduits in the new rectory of the Roman Catholic Cathedral of the Assumption and has finished similar work upon St. Charles Barromoe's Roman Catholic Church. The Realty Apartments in Bowling Green, Ky., are being supplied with wiring, bells, fixtures and annunciators by this company, and it is installing a silent electric signal system, composed of lamps, in every room and ward of the Norton Memorial Infirmary in Lousiville.

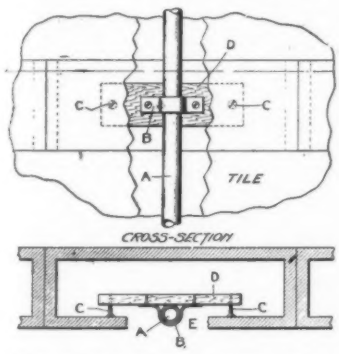
Dollar Wiring Kinks.

Every reader is invited to contribute to this column. It does not matter how few words are used to explain a "Dollar Wiring Kink," provided the idea is made clear; and if a diagram is necessary, a rough pencil drawing will serve. The idea itself must, of course, be new and bright. A dollar will be sent to the contributor upon publication.

Supporting Conduits on Hollow Tile.

In wiring houses built of hollow tile it frequently becomes necessary to cut notches or grooves into the tile for the purpose of running the conduits for circuits to side brackets. In such cases I have found the following a very good method for fastening the conduit.

After notching the tile I insert a small piece of board into it sufficiently long to span the notch (See *D* in accompanying figure). After this I fasten the pipe strap *B* by means of wood screws. If this does not set the pipe



Supporting Conduit on Hollow Tile.

back far enough, screws may be set at the points *C* of sufficient length to bring the tube into the proper position and hold it firmly in the notch at *E*.

C. R. Robbins.

Cup for Soldering Paste.

The best receptacle for carrying soldering paste, now almost universally used by wiremen, is an ordinary grease cup, commonly used on auto springs and general machinery. It is strong enough to stand the contact with heavy tools in the bag and by screwing down the cap the desired amount squeezes out and it returns to the cup by unscrewing. The small cans and tubes are too frail for the ordinary kit and practical wiremen will appreciate this kink. If desired a cap can be screwed on the attaching thread of the grease cup. This, however, is unnecessary.

Ben R. Browne.

Convenient Data for the Electrician.

If the eelctrical worker is as well acquainted with the standard wiring table as he ought to be there is very little need of his having to refer to a table often; for such caluclations as finding the voltage drop in a circuit, the resistance of any length of circuit, etc., can usually be done with sufficient approximation by the use of relations which one can easily remember. For example, suppose it is desired to find what size of wire must be used in order to make sure that the voltage drop in a given circuit will not exceed a certain specified amount. The drop in voltage is, from Ohm's law, equal to the current in the wire multiplied by its resistance. So, when the current is known the total allowable resistance of the circuit can easily be found. Having found this, the electrician should remember that the resistance of a No. 10 wire is approximately one ohm per 1,000 feet, and that for every change of three sizes the resistance is either halved or doubled, depending upon whether the change is toward the larger sizes or in the opposite direction. Thus, the resisance of a No. 7 wire is half an ohm per thousand feet, and with a No. 4 a quarter of an ohm, etc., while the resistance of a No. 13 is two ohms per 1,000 feet, etc. The resistances of intermediate sizes of wires can easily be interpolated, so that the necessary size of conductor can be determined closely enough without any reference to a wire table.

It is understood of course that these remarks do not apply to long circuits for the transmission of large amounts of alternating-current power.

Howard R. Smith.

Another Scheme for Wiring Fixtures.

In wiring chandeliers and brackets it is often difficult to get the wires into the arms, on account of the numerous bends and sharp turns. A good way to overcome the difficulty is to take a strong thread rolled into a small ball and start this ball into the open end of the arm. Then by blowing against the ball and pushing the thread in after it, the thread can usually be carried through the tube readily enough; after which a stronger string or a bare wire may be pulled through by means of the thread, and this used to pull the fixture wire through.

Henri Piccard.

Boring Holes in Glass.

The electrician may sometimes want to bore holes in a piece of glass for running wires or a bolt through, and he may accomplish the task as follows: Take a three-cornered file and break off the point to about the size of the required hole; then grind the end of the file to a diamond point, finishing the grinding on a whetstone. When ready, hold the drill by hand perpendicular to the glass and turn slowly, pressing just sufficiently for the drill to take hold. Keep the drill point wet with turpentine or water. After the outer hard crust on the glass is pierced, the inside will be found comparatively soft, and one can see chips of glass being cut from the hole. When nearly through, start on the other side of the glass and bore through. The drill must be kept sharp.

Henri Piccard.

Screw Starter.

A very convenient tool to start a screw in a small space such as meters, arc lamps, etc., when repairing them, is made as follows: First take a screw driver and cut off the hardened end of the bit, then cut a slot in the bit as shown, then get a clock spring and

Tool For Starting Screws.

cut two pieces three-quarters of an inch long (one-half inch is plenty to extend from the end of the bit). Then place it in the slot as shown and solder it firmly.

Cecil C. Yelch.

Sign Wiring.

On account of the improvement in tungsten sign lamps, I have found it a saving if in signs wired series-multiple for low-voltage tungsten lamps, the multiple circuits are connected in series outside on the sign. The wiring then may be changed to multiple in a very few minutes at little cost, so that the 110-volt and 60-volt lamps that will soon be in general use can be used. The general practice now is to connect the multiple inside of the sign, so if any change is made later the sign will have to be removed from the building and rewired at great cost.

William Dower.

Legal Notes

LIABILITY OF ONE FURNISHING AN ELECTRICAL CURRENT TO BE DISTRIBUTED BY ANOTHER FOR INJURY TO THIRD PERSON AFTER DELIVERY.

By Maguire and Mooney.

The responsibility of a generating company for injuries from electric shock occurring upon the lines of a distributing company which is supplied by it with power, differs in different jurisdictions. Decisions in Kentucky and in West Virginia are not in agreement and in many states no precedent has been established. The ruling in West Virginia that a company is not liable except for accidents upon its own lines is the more reasonable.

This subject was touched slightly in the first article of this series, but since that time several important decisions have been rendered enunciating the rules so that it becomes necessary to consider the matter more thoroughly. At first glance the subject may seem startling, for to hold a company for injuries incurred after another person or company has purchased it, without any special negligence entering into the matter, seems absurd. But, nevertheless there are phases of this question that not only make it amazing but an actuality.

Electricity is considered such a dangerous element that the courts have often declared that the mere transference of it to another company did not relieve the first company of liability if certain injuries resulted. Errors in the power house may cause injury miles away, and the wires at that point may not be owned by the producing company at all. In the case of Clonts vs. Laclede Gas Light Company, 140 S. W. Rep., 970 (see ELECTRICAL REVIEW AND WESTERN ELECTRICIAN, February 10, 1912), a man was killed by a shock caused by a sudden influx of 2,500 volts, which was occasioned by the Laclede Company's wires crossing the Union Light Company's wires at a distance of over five miles from the place of the accident And there are numerous other cases that have not gone to the higher courts that show that some error in the central station caused the death or injury.

The case of Thomas vs. Maysville Gas Company, 108 Ky., 224, started the discussion of the question, and while it has been overruled frequently by courts in other states yet it is a case worth noting. The case held that a corporation which generates and sends electricity into the wires of a street-car company is chargeable with the duty of seeing that the wires are properly insulated, and it, as well as the street-car company, is liable for the failure to perform that duty if a person is killed because the wires are not properly insulated. In this case the street-railway company owned and had charge of the wire, and the company generating the electricity furnished it to the company for a certain compensation per month. The electric company urged that a manufacturer of electricity, who delivers it to another, and in this manner parts company with it,—its dangerous character not being concealed, and such other person being competent to look after and control it—does not owe any further duty to anyone. The court held that inasmuch as the control of the current remained in the electric company that the company was also liable.

The control did remain with the electric company, as the court stated, because the boy could not be rescued until that company had stopped the electric current, but the court evidently overlooked the fact that it was not necessary to go back to the producing company to turn off the current; all that would be necessary would be the easy throwing of a switch by an employee of the second company. But if, as the court held, it was the duty of the company producing the current to see that the wires and appliances of the company purchasing it were safe before it supplied it, then it would undoubtedly be the duty of the company to maintain a corps of inspectors to be constantly examining the wires of the companies to whom the current was sold.

In the case of Fickeisen vs. Wheeling Electrical Company, 27 L. R. A. (N. S.), 893, the opposite and general rule is announced. The Wheeling Electrical Company operates a power plant for the production of electricity for lighting streets and houses. The Bridgeport Electrical Company is a separate and distinct corporation and it supplies the city of Bridgeport, W. Va., with electricity. The wires that fell to the ground and by which a man was killed, were owned by the Bridgeport Company, and it also owned all the poles and appliances in that vicinity; but the Wheeling Electrical Company supplied the current. The Bridgeport Company had a switch for the purpose of cutting off the current from the wires. Which of the two companies is liable for the death? Suppose that the Bridgeport Company had a storage battery for the storage of the electricity and that the Wheeling Company had delivered the electricity to that storage battery, and thereafter the Bridgeport Company had taken it therefrom to light the streets. If, under these circumstances a wire of the Bridgeport Company would injure a person, surely the Wheeling Company would not be liable. But, of course, in determining this, not only the ownership of the poles and wires must be considered, but also the ownership of the electricity. Where does the ownership of one company stop and the other begin? The only reasonable answer to this would be that the Bridgeport Company owned it as soon as the current entered the wires of that company or came under its control. It cannot be conceived that two companies should attempt to regulate the wires of one of the companies. If one company sells a certain amount of electricity, and delivers it to one capable and able to take care of it, then that company should be through with the matter. Any other rule would require the company to inspect miles of wires that did not belong to it, and the expense would be enormous. And suppose the producing company did inspect and found a wire or a pole in bad condition. Would it have the right to order the removal of the wire or the pole, or could it remove such? No. Its employees would be guilty of a trespass if they did. Could they turn off the power and refuse to furnish current until the pole or wire was removed or repaired? Not at all. The contract to furnish the current would

compel them to go on, and they could not turn it off.

Take the matter of franchise alone. There were separate franchises for each company—one company could not operate in the other's district. The franchise did not provide how the Bridgeport Company should secure its current, whether through its own generation or through purchasing it. And by no reasonable method could it reach out and fasten the liability upon an outside company.

There are only a few important cases on this point, but it is necessary to consider these to see which is the better rule than that which is followed. The rule enunciated in the Wheeling Company case has within the last few months been applied again in West Virginia. The court in that case said unequivocally that a generating company is not liable if the lines of the company over which it is carried to the consumer are not in safe condition.

Merrill Perry, a boy of 11, was killed in the following manner. He and a number of other boys were playing in one of the streets of Gyandotte near a guy post, or "stub," to which was tied a guy wire supporting one of the poles between which was suspended an arc lamp used to light the street. The stub stood about a foot from the board sidewalk, and the guy wire was tied about seven feet above the walk and around the electric light pole, which was about 28 feet high and stood about 40 feet away from the stub. The guy wire was fastened around the electric light pole about two inches above the span wire supporting the arc and came in contact with it, and because of lack of insulation between the span wire and the electric light wire, became charged with electricity, and had been so charged for a week or more before the accident. One of the older boys picked up a piece of wire about eight feet long, bent one end of it to form a hook, and hung it over the guy wire. The loose end of the wire hung down near the sidewalk and the boys would amuse themselves by touching or catching hold of it. The board walk being an imperfect conductor only a slight shock would be felt. One of the boys pulled on the wire and then let go of it and it swung away from the sidewalk, and Perry, who was standing on the ground, caught hold of it and was instantly killed.

The company claimed it did not own, control or operate the electric light wire and poles where Perry was killed, but that it only furnished electricity to the Consolidated Light and Railway Company, another corporation, and that the latter company was the owner and operator of these wires and poles. It further claimed that the hooking of the loose wire over the guy wire was the direct cause of Perry's death and not the maintenance of uninsulated wires.—Perry vs. Ohio Valley Electric Railway Company, 74 S. E., 993.

Also in the case of Byrd vs. Pine Bluff Corporation, 145 S. W., 562, the same rule was followed. Byrd was employed by the company as a workman in the gas and water department, the company being engaged in furnishing gas, water and electricity. He was sent to remove from a store building certain old gas fixtures and apparatus, the use of which had been discontinued by the occupants. He had with him a helper who was working under him and they had both been warned about coming in contact with electric wires. After taking down the fixtures inside of the building it became necessary to remove the small copper wire by which the gas had been ignited. This wire ran along the ceiling of the building between two electric light wires. After cutting loose the wire on the inside, Byrd was standing on a box on the outside of the window, drawing the wire through a hole in the casing, when the wire touched an uninsulated part of the electric wire and the resulting shock killed Byrd.

It did not appear from the evidence who put the electric wiring in the building and there was no evidence that the company had anything to do with it. Three years before the accident the electric service had been discontinued, but shortly before the accident the tenants in the building resumed it again. The court (Arkansas) held that the company was not liable, under the rule above stated.

Accordingly there are two rules, one just the reverse of the other. The Kentucky rule is that the generating company is responsible, and the West Virginia rule that the company is not responsible. The merits of the rule are all with the West Virginia rule, but nevertheless in the course of future cases arising, some courts may adopt the Kentucky rule. As only a few states have so far been called upon to determine, other states will soon be determining the matter. If the Kentucky rule is followed in the larger states it will cause great inconvenience, annoyance and may, for a time, even stifle the ambitions of electrical companies toward economy. This should be avoided, and efforts should be made to prevent the Kentucky rule becoming universal.

There was a decrease of nearly 28 per cent in the production of iron ore and a smaller but noteworthy decrease in the production of pig iron and steel in the United States in 1911.

American Museum of Safety to Award Annual Medal.

The Allgemeine Electricitäts Gesellschaft, of Berlin, Germany, has cabbled President Arthur Williams of the American Museum of Safety that the Rathenau gold medal has been placed at the disposal of the Museum for award annually for the best device or process for safe-guarding life and limb or promoting health in the electrical industry. The competition is open to every country in the world, the only condition being that the device or process must be exhibited at the American Museum of Safety in New York City. This is the first time that the bestowal of a high European honor has been given to an American institution and indicates the standing of the American safety museum among European scientists.

The Rathenau medal is well known in the European scientific world. It was presented to Emil Rathenau, president and founder of the Allgemeine Electricitäts Gesellschaft, on the occasion of his seventieth birthday, with the felicitations of the Kaiser for the services he had rendered in the field of electrotechnics.

Louisville Contractors Have Outing.

The Louisville Electrical Contractors' Association, Louisville, Ky., cooperated on Labor Day with the members of the Lousiville Builders' Exchange to celebrate the annual outing of the latter organization of the allied building trades at Hike's Point, a rustic spot not far distant from the Gateway City. The electrical men enjoyed a day in the open with all the zest and abandon of school boys. There was more than enough to eat and drink, and there were athletic contests of all sorts, including a memorable baseball game in which President Frank Good, Vice-president C. C. Childers and Secretary Gus Albrecht participated, with a vengeance. Herman Tafel, the well known supply dealer, won the slow race in phenomenally sluggish time.

Western Electric Company Employees Win at Track and Field Meet.

At a dual track and field meet held on the athletic field of the Hawthorne works of the Western Electric Company, on September 7, employees of this company won nearly every event contested by the employees of the Chicago Telephone Company. Nearly 5,000 spectators watched the contests in which the Western Electric team scored 85 points against 50 made by the Chicago Telephone team.

Questions and Answers

All readers of the Electrical Review and Western Electrician are invited to submit questions and answers to this department. Full names will not be printed except where the writer indicates his willingness therefor. Anonymous communications will not be considered. Questions relating to electrical matters of any kind will be inserted. Answers from our readers should be received in this office preferably within ten days of the date of publication of the question, and will be published in a subsequent issue. Payment will be made for all answers published.

Questions.

No. 89.—Compact Series-Multiple Switch for Heaters.—Is there procurable on the market a compact series-multiple switch (not larger than an ordinary rotary snap switch) that may be used to connect the two parts of an electric heating element in series or in multiple so as to get a low and a high heat?—F. L. E., Lockport, N. Y.

No. 91.—Extra Lighting on Moonlight Schedule.—In the case of a village that has contracted with a local electrical company for the lighting of its streets on the moonlight schedule, has the village the right to demand lighting on stormy or cloudy nights when the moon is obscured? Has this matter been the subject of controversy? What is the practice in regard to such extra lighting in villages where it is furnished?—W. M. V., Allegan, Mich.

No. 92.—High-Tension Underground Cables.—I have been told that it is proposed to use 60,000-volt underground cables in a German power system, but have always understood that 20,000 is regarded as the practical limit in this country. What makes it possible to raise this limit abroad?—H. W., Cincinnati, Ohio.

No. 93.—Grounding of Squirrel-Cage Rotors.—Why are the rotors on squirrel-cage induction motors grounded? I have taken several new motors apart and found them all in the same condition.—J. H., Rock Island, Ill.

No. 94.—Time Switch for Burglar Alarm.—I installed a burglar alarm in a private garage, whose owner has repeatedly complained that it did not work. Every time I test it I find it to be O. K. and I am convinced that the man's chauffeur chronically forgets to put it "on" when he leaves at night. Could a time switch be used to put it "on" and "off" automatically at the right time?—R. T., St. Louis, Mo.

Answers.

No. 86.—Voltage of Mining Locomotives.—What is the standard voltage for electric locomotives used in mines for the haulage of metallic ore? Would it be safe to use 500 volts on the trolley in a dry mine?—C. J. N., Sheridan, Wyo.

The most commonly used voltage for mining locomotives is 250 volts direct current, in fact, this is practically standard except where particularly favorable conditions prevail. If the headroom is ample and the mine is dry and not fiery, 500 volts may be safely used. Of course it is necessary to caution the workmen about the danger of coming in contact with a 500-volt trolley. There are quite a few installations working satisfactorily at 500 volts; but, unless it is a long-haul proposition or power comes a long distance from the generating station or substation, I consider 250 volts as sufficiently economical and much safer under ordinary conditions of dampness, low headroom and class of labor available.—M. B. S., Denver, Colo.

No. 87.—Origin of Indirect Lighting.—Where and when did the idea of indirect lighting originate? I have heard some people claim that it was in use by the ancients and others that it was devised only a few years ago.—B. E. S., Evanston, Ill.

Indirect lighting as such, while old of itself, should be considered as of comparatively recent date as far as general use and practice is concerned. There are early patents on record which show the indirect principle, particularly in certain patents for light-house and ship illumination. The writer has seen drawings of the patents mentioned, which show a scheme for reflecting the light through tubes. According to Mr. Ryan in his lectures on illumination, the patents mentioned were considered to anticipate patents which were proposed to be taken out on the ceiling reflection idea for large buildings.—P. E., Minneapolis, Minn.

No. 88.—Selenium-Cell Circuit-Closer for Street Lighting.—A short time ago I read that buoys can be automatically lighted at the approach of darkness by means of a selenium-cell arrangement. Has this been used for closing street-lighting circuits?—J. R. W., Mackinac Island, Mich.

The plan proposed would certainly make a nice experiment but until selenium cells are made more permanent in their action, more responsive and reliable, and less delicate, the plan can hardly be expected to be practical. Even then, its usefulness seems doubtful. The selenium control for buoys mentioned may work well as an experiment, but the writer believes the practice of this and other selenium controls based on the changing conductivity of selenium to be impractical at present for the reasons noted. The present cells available require delicate auxiliary apparatus, such as relays, etc., are slow in action, and must be renewed after a little time. The plan to use selenium for the wireless telephone and telephote is also limited for this reason, although Dr. Korn has succeeded in overcoming the defects by an ingenious arrangement. J. R. W. is referred to "Wireless Telephony," by Ernst Ruhmer, and to T. T. Baker's book on the transmission of photographs, for further data on selenium cells and their peculiarities.—P. E., Minneapolis, Minn.

No. 90.—Ozonator for Chemical Laboratory.—In a large chemical laboratory in a high school the pupils generally complained of the noxious gases. The room had a special ventilating equipment and special gas hoods in which chlorine, hydrogen sulphide, ammonia and other evil-smelling gases were supposed to be generated, but considerable quantities escaped into the room and were sometimes even blown into the main building when the wind was in a certain direction. Would a powerful ozonator have remedied this condition?—H. S., Peoria, Ill.

The most enthusiastic advocates of the use of ozone have never claimed that it was of any use in destroying or oxidizing such inorganic gases as are usually produced in a high-school laboratory. Ozone is quite effective in destroying certain organic gases or noxious products that result from bacterial activity, putrefaction, or decay. In this particular laboratory I believe that an ozonator would be of but little avail.—B. V. N., Ithaca, N. Y.

From the writer's experience under similar conditions, it is not thought that the ozonator plan will be of use. The ozonator finds its use more particularly as a purifier for vitiated air and is best used in moderation. The plan to superpose the purifier on the other gases does not appear practicable. Remedies suggested are: 1. An exhaust fan in the hood. 2. A separate ventilation system for the chemistry room. This should include an exhaust fan, and must be arranged so as not to interfere with the regular ventilation or cause drafts. A large exhaust fan is essential to take off the gases as soon as they are generated and get into the atmosphere. For details, consult a local sanitary or mechanical engineer.—P. E., Minneapolis, Minn.

Western States Gas & Electric Expanding.

The Western States Gas & Electric Company, which operates in California, has during the past 90 days connected up new business aggregating 1,500 horsepower in small motors for irrigation plants.

This company, which is under the management of H. M. Byllesby & Company, is taking an active part in the development of its territory and many farms and ranches are availing themselves of the possibilities of electric power. The rates are as follows. For the first 1,000 kilowatt-hours, three cents per kilowatt-hour; for the second thousand, 2.5 cents; for the third thousand, 2 cents; over 3,000, 1.5 cents.

A CO-OPERATIVE MEETING OF ELECTRICAL MEN.

Representatives of the Central Station, Electrical Supply Jobbers, Electrical Contractors, and the Manufacturers of Electrical Apparatus Hold Remarkable Meeting, September 2, 3, and 4.

The electrical industry has developed in a phenomenal fashion in the last 20 years. The last six years, despite an almost universal depression, the growth of the industry has been tremendous. Although all this has been accomplished, there has been extant an idea that through the co-operative effort of all the elements interested in the electrical industry this development might go on at an accelerated rate. One of the most energetic and resourceful of the leaders who have contributed to this idea is J. Robert Crouse of Cleveland, Ohio. Mr. Crouse has been active in this matter for a long time, and to some degree his efforts have been crowned with success culminating in the great meeting which was held at Association Island, Lake Ontario, September 2, 3 and 4.

The meeting was participated in by representatives of the central-station interests, the electrical supply jobbers, electrical contractors, the manufacturers of electrical apparatus, and the electrical press. Those in attendance were the guests of the Association Island Corporation, and the program was arranged and the invitations issued under the direction of Philip S. Dodd, general manager of the co-operative development department of the National Quality Lamp Division of the General Electric Company.

Practically all of those attending the convention reached Sackett's Harbor on the morning of September 2, where H. H. Cudmore, who acted as master of ceremonies, met the incoming vanguard, arranging for the transportation of the passengers and luggage aboard the 76-foot yacht "Dauntless," and the cruiser "Wahine." September 2 was given up to renewing of acquaintances and getting together in a social way.

September 3 was devoted to a series of addresses on co-operation. F. M. Tait, president of the National Electric Light Association, was chosen permanent chairman of the meeting. The program was outlined as follows:

Address of Welcome—A. D. Page, "Association Island as a Co-operative Meeting Place."

F. M. Tait, President National Electric Light Association, "What Co-operative Effort Can Do for the Electric Lighting Industry and the Industry as a Whole."

W. E. Robertson, representing the National Electrical Supply Jobbers' Association, "What Co-Operative Effort Can Do for the Jobbers."

Ernest Freeman, President National Electrical Contractors' Association, "What Co-Operative Effort Can Do for the Contractor."

R. L. Jaynes, Jupiter, Sons of Jove, "The Rejuvenated Sons of Jove."

T. I. Jones, Vice-Chairman, Commercial Section, National Electric Light Association, "The Commercial Section."

J. C. McQuiston, manager Westinghouse Department of Publicity, "Co-Operative Publications."

R. V. Scudder, "A Co-Operative Advertising Service."

Frank H. Gale, advertising manager General Electric Company, "Co-Operative Publicity."

Frank B. Rae, Jr., publisher *Electrical Merchandising.* "The Co-Operative Newspaper Page."

H. H. Cudmore, general manager, Brilliant Electric Works, "Harmony Luncheon Clubs and Electrical Leagues."

Philip S. Dodd, general manager, Co-Operative Development Department, National Quality Lamp Division of the General Electric Company, "A Suggestion for an Organization."

Mr. Page extended on behalf of the Association Island Corporation a hearty welcome. He counselled the meeting to work together in a fraternal way for the betterment of the business as a whole, and expressed the hope that the Island would continue to be used as a place where men could get together and discuss their mutual interests and leave with a better understanding of each other, and a better regard for each other.

Mr. Tait, for the Central Stations.

Mr. Tait outlined his ideas with regard to methods of co-operation, and emphasized the necessity for each of the elements involved approaching the idea of co-operation with an open mind and a determination to eliminate personalities and personal selfishness in the attempt to bring about that method which would inure to the benefit of all. He did not think that it was possible to organize the United States and accomplish the scheme of co-operation in a short time, but that if it was worked out in a calm, businesslike manner he was confident it would prove a very important factor in bringing about a better condition in the industry as a whole.

Henry L. Doherty

John F. Gilchrist.

A. C. Einstein.

Central Station Men on Committee to Organize Co-operative Movement.

The Jobbers Strong for Co-Operation.

Mr. Robertson said that the electrical supply jobbers as a class have always been in thorough sympathy with a co-operative movement. The jobbers have always given the movement an attentive hearing, and have always been open-minded in their relations with it. He believed that it was especially desirable that the central station, the jobber and the contractor work together mutually so that there would be a sound merchandizing effort upon the part of the local dealer and contractor to carry better stocks, and to energetically campaign for the sale of cur-

rent-consuming devices, and for the jobber to handle large stocks to supply the dealer and the contractor, in addition to the central station interesting the public in these devices, in this way having all the branches of the industry interested in pushing their sale and use before the public. If such a plan of mutual interest and co-operation is evolved, Mr. Robertson believed that the future possibilities were far beyond anything now existing in a business. He believed the time had come when in a good many localities absolutely sound co-operation can exist between the jobber, central station, dealer, contractor and manufacturer. The one big thing that all can agree upon is the idea that if a little is chipped in by everybody in a co-operative movement for the purpose of rapidly improving the electrical industry, there is bound to result an increased profit to all. That idea appeals to all as being sound. It is necessary, however, that the movement be sound in its conception, that there shall be no suspicion that the movement is being controlled for the benefit of any particular industry or part of the business. If men can be satisfied as to that fact, and he felt absolutely confident that men could be satisfied as to that fact, the first important step would have been taken toward the accomplishment of what is sought. The launching of the scheme would require a thoroughly considered plan which promises commercial success and which will impel the continued interest over a period of time of the men in the business who are delegated by their organizations to make it a part of their business to see that the plan succeeds. If the men who may be selected to do the work only give it casual atttention, and feel that if it does not succeed the amount of effort and money that has been put into it does not amount to much individually, it is bound to be a failure and there is no use launching it. He believed the plan worthy the earnest and entire attention of the men who may be selected to work out the practical side of the problem.

The Contractor's Opportunity.

Mr. Freeman said that as the result of the right kind of pulling together he could see the electrical contractor coming into his rights, but he was unwilling to admit that the results would be any more beneficial to the contractor than to the manufacturer, jobber or central station. He thought that the electrical contractor was today in a better position than ever before. His general condition is improved, and he is a bigger business man. The joint publication of such periodicials as the *Electrical Equipment of the Home, The Home Beautiful,* and any co-operative publicity which will bring before the public the great benefits of the use of electrical energy in every form, will tend to greatly stimulate its use and the contractor will come in for his share of increased business. The contractor who fails to avail himself of the opportunities offered by advertising in the "Peoples' Electrical Page" is making a mistake. This is the place for the contractor to spend money, because if the demand is created or the desire is instilled into the public mind for electrical apparatus, the contractor must let it be known where he is and what he has in order that these desires may be gratified.

The Sons of Jove.

Mr. Jaynes outlined the organization and growth of the Sons of Jove. The object of the order is the cultivation of a spirit of fraternity and good-fellowship from which may grow practical plans for commercial co-operation. During the present year the membership has increased 2,600 and today numbers closely to 8,000. The leaders of the electrical industry have become convinced of the importance and the value of the work the order has striven to accomplish, and there is now available an organization that can go on and be an important factor in the laying out of plans for practical co-operation. The annual convention will be held October 15 and 16 at Pittsburgh, and it is the duty of every Jovian to go to Pittsburgh and have a hand in the proceedings there. That is the time to work out plans for the betterment and improvement of the order. The Sons of Jove represent every element of the electrical industry. The order has no selfish interests or self interests to conserve, but is boosting the whole game.

The Commercial Section.

In the absence of Mr. Jones, Philip S. Dodd, as past secretary of the commercial section of the National Electric Light Association, gave a brief outline of what the section had accomplished during the last two years. In the first year of its existence it had worked up a membership of 826, mostly among the central-station interests, and last year the membership had increased to something over 1,300. In addition to the regular reports which had been prepared by committees, reviewing certain phases of central-station work that were of particular interest to the commercial arm of the industry, five publications for general distribution for the development of the industry as a whole have been prepared. During the last year the commercial section had published a data book covering installations of power and lighting companies, the figures on these installations covering a definite period of time. The five special publications for general distribution were the "Electrical Equipment of the Home," "Electrical Service in the Home," "Data on Electric Signs," "Street Lighting," and "Modern Industrial Lighting." The jobbers and electrical contractors contributed liberally to the publication of the two first men-

L. A. Osborne.

J. Robert Crouse.

W. A. Layman.

Electrical Manufacturers on Committee to Organize Co-operative Movement.

tioned booklets, and the first distribution amounted to 33,000 copies. The central-station commercial departments have also purchased and distributed for the development of their business a sufficient number to run the edition up to nearly 100,000 copies. Of the other publication there have been distributed about 70,000 copies.

R. V. Scudder,
Representing the Jobbers.

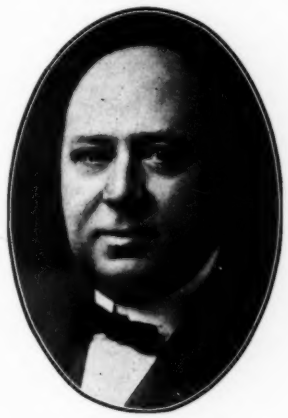
Arrangements were made with the National Association of Manufacturers to distribute the booklet "Modern Industrial Lighting" to 5,000 of those members who are men operating industrial plants in various parts of the country. This distribution has also resulted in a very wide demand and appreciation of the book from other quarters. The Commercial Section has under consideration further plans for the development of the data book, and is planning the publication of five more books covering special phases of electrical service. Electrical development of farming utilities will form the basis of a special publication. At its meeting in Seattle, the Commercial Section decided to broaden its effort by adding to the executive committee one member representing the jobbing interests, and one man representing the contracting interests. This is just another illustration of the fact that the value of co-operation is beginning to be realized and recognized by all.

Co-Operative Publications.

Mr. McQuiston said the same care should be exercised in distributing printed matter provided to the dealer by the manufacturer as if the local interests themselves paid for it. Too often the publications furnished by the manufacturer are not appreciated because no charge is made for them. The local salesman should be familiar with everything that the literature offered by the manufacturer contains, and would make use of this literature only when he had failed to make his sale and desired to leave with the prospective customer something tangible as an evidence of the discussion.

Mr. McQuiston laid special emphasis upon the desirability of proper display of electrical merchandise. A woman coming into a store is not particularly interested in a display of dry batteries, wiring material and switches, and if she is confronted with a selection of low-priced material, the cost for a percolator, a chafing dish or other more expensive current-consuming device may strike her as prohibitive. Material should be arranged on neat tables, and the articles in greatest demand should be placed at the rear of the store so that if the prospective customer desires to examine a flatiron, for instance, her attention is first directed to the chafing dish, toaster, percolater or some expensive piece of apparatus.

Ernest Freeman.



W. W. Low,
Representing the Jobbers.

Mailing literature should be a matter of special study. The dealer should select the best mailing list possible, and eliminate as soon as possible all dead names from his list. It is much better to concentrate on 500 apparent buyers than take chances with a thousand poorly selected names. The dealer should also be very careful in the amount of printed matter he distributes at one time, and should concentrate to some degree upon the representation he makes to his prospective customers. Where several pieces of litera-

E. McCleary.

P. N. Thorpe.

J. R. Strong.

Electrical Contractors on Committee to Organize Co-operative Movement.

ture, all describing similar apparatus but manufactured by different companies, are placed in one enclosure, the prospective customer loses interest because of the random and ineffectual impression made by the heterogeneous collection of information.

The Modern Publicity Manager.

In discussing "Co-Operative Publicity Possibilities," Mr. Gale pointed out that publicity is and always has been a most potent factor, and that its influence is growing stronger and stronger with the tremendous increase in the production and circulation of magazines and newspapers. The publicity manager has taken the place of the old-time press agent. He is preferably a former newspaper man who thoroughly understands the newspaper business and knows what editors like to see and what people like to read. He wisely lays before the public the facts in any case involving his organization, and instead of the news being distorted he is often able to actually create a favorable impression for his company. The modern publicity man realizes that there is a great deal of valuable news connected with every industry in which the public is vitally interested, and it is his first duty to see that editors and writers have access to this information. Where technical terminology is involved the ordinary newspaper man and the still more ordinary reader cannot comprehend the jargon, and the publicity manager must translate the terms and phrases of the industry into the language that the man on the street can understand. The readiness with which these articles are accepted indicates the great interest of the readers.

A great many of the central stations and manufacturers in the electrical business are not able to organize their own publicity departments, and the situation, therefore, points largely to the value of an independent publicity organization supported by the industry at large. Such organization must observe strictly the trade ethics in planning publicity either for newspapers, magazines or technical papers. The violation of a few small rules will insure the failure of the desired publicity. Publications should not be expected to print advertising matter free of charge. Nothing but straight, legitimate news and good educational matter should be supplied. Publicity should never be construed as advertising space. No publication should be approached with a proposition to insert a small advertisement and give a large free news article on the subject. If the material is something the readers will like the editor will be glad to publish it. Petty tricks and dishonesty should never be resorted to for the sake of a few lines of publicity.

Industry Most Fertile for Publicity.

The electrical industry today is the most fertile field for publicity. Great inventions, new methods, enormous undertakings, novel installations, and the prominent part taken by electricity in the wonderful progress today offers abundant material for the publicity man working in the interest of the industry at large. The publicity bureau should be recognized by writers and editors everywhere as a source of real news on electrical subjects. It should be prepared to supply notes on electrical subjects for use by local lighting companies whenever they are themselves unable to keep their local editor supplied with sufficient material.

So far as the "People's Electrical Page" is concerned there is no reason why a considerable part of the material for this page should not be supplied from the central bureau, and there is no objection to the same matter appearing simultaneously in electrical papers published in the different cities. The preparation of such material by the central bureau would be a distinct relief to the overworked men who are now attempting to handle it in the various cities in which the page is published.

The co-operative publicity bureau should undertake the management of these electrical pages in all of the different cities, maintaining a traveling representative who could personally keep in touch with each situation. It should not, however, be called upon for financial support of such pages. One great value of the local electrical page is as a stimulus for closer co-operation among the local electrical interests and this is at once removed when outside financial support is accepted.

The bureau could further extend its services by maintaining regular electrical news items in the household columns of women's magazines, popular magazines, co-operating closely with the electrical press, and the bulletins of various organizations.

Under the heading "A Co-Operative Advertising Service," Roger V. Scudder outlined a plan for correlating the effort of national advertising bureaus, advertising agents, and the publicity departments of electrical interests in creating a central bureau for the preparation of trade-influencing literature. The electrical interests in every part of the country could secure from this central bureau information with regard to mailing lists covering any phase of the industry it might be interested in, and thus eliminate a great deal of expense that is duplicated when matters of this kind are handled individually.

An Educational Medium.

Mr. Rae discussed the "Co-operative Newspaper Page." The function of the electrical page was first to educate the public to a wider use of electrical service and a more general and consistent utilization of current-consuming devices; eliminating the prejudice against the alleged high price of these devices, and removing the fear which is sometimes prevalent in the mind of the average householder with regard to the use of electrical facilities. This also includes the combating of the hatred upon the part of the public of the public-utility companies, and opposing municipal ownership propositions.

The second function of the page is the bringing together of the local interests into a harmonious scheme for the betterment of local conditions. The third function is the education of these local interests to the value of advertising and developing their own business.

The formation of local electrical clubs, harmony luncheon clubs and Jovian clubs, with the club having the support of the people's electrical page, as a fundamental part of its plan of existence, will place the page upon some basis of responsibility, and if there is the proper co-operation between the newspapers, the local interests and the central stations the necessary funds will be forthcoming. The educational articles and news items could then be procured from the co-operative copy bureau described heretofore.

Maintaining Harmony Clubs.

Mr. Cudmore presented a critical and excellent discussion of harmony luncheon clubs and electrical leagues. He pointed out that of the large number of electrical clubs that had been formed in various cities only a few were making use of the opportunities their membership gave them in helping to develop the electrical industry. Where a really sincere effort had been made upon the part of the local club to bring about co-operation between the various elements in the business, very substantial progress had been made. In Cleveland the success of the "People's Electrical Page" and the electrical league was assured. There it had been demonstrated that the local electrical interests co-operating with the central station had very materially increased the network of distribution, and the load on the central-station lines. Important matters had been arranged between the city council and the local inspection bureau so that when it was apparent that the discarding of a certain ordinance would have worked a hardship on the contracting interests a proper presentation of this matter upon the part of the officers of the league had resulted in a beneficial and amicable settlement of the controversy.

If the co-operative movement is to

see its widest and most rapid fruition no better opportunity for the acceleration of the movement is available than among these already organized electrical leagues and Jovian luncheon clubs. Mr. Cudmore suggested the appointment of a traveling representative to visit regularly every city where the clubs or leagues have been established, and to make it his business to initiate the movement wherever it was possible all over the country. This would require a leader who would in turn instill into the minds of leaders in every district the basic ideas which would make for the rapid and complete development of the idea.

General Discussion.

Chairman Tait announced that the conference had reached a point where it might be well to have a general discussion of the suggestions already advanced and called upon A. W. Burchard, of the General Electric Company, to open the discussion. Mr. Burchard said that in his opinion organized effort along any line when properly directed is more efficient than any individual effort. The big problem which faced the present situation is the harmonizing of the divergent interests involved. Some of the interests would preponderate over others and there must be concessions and the subordination of the lesser considerations so that the industry as a whole might profit.

Philip S. Dodd,
Secretary Co-operative Committee.

S. L. Nicholson, general sales manager of the Westinghouse Electric & Manufacturing Company, gave his endorsement to the working out of the ideas elaborated and said so far as the Westinghouse interests were concerned that they would be glad to help fo organize the movement and would cooperate to the fullest extent to bring about its entire success.

Some very practical discussion was injected into the situation by Gerard Swope, general sales manager of the Western Electric Company. Mr. Swope pointed out that there was no dispute as to the desirability of cooperation, but it would first be necessary to establish certain basic principles with regard to the extent to which the various elements in the situation would co-operate. Where there is cooperation between central stations and the jobber, the Western Electric Company is pleased to make a big expenditure, and if this co-operation could be secured and assured in every part of the country his company would not hesitate to enter into a wide-spread campaign for the introduction to the public of current-consuming devices. Where, however, there was a conflict of the interests of the central stations, the jobbers and the contractors, and where these conflicting interests could not work together on a mutual basis, an effort at harmony would be of little avail. Mr. Swope was of the decided opinion that the electrical jobber performs an economic service in the distribution of electrical devices and that this service should be recognized by his being able to make a profit out of his business.

Z. W. Carter, of the Pettingell-Andrews Company, Boston, described the formation of the Electrical Development Association bringing together the central-station men, the contractor, the supply man of New England. The formation of this association has resulted in the local contractors and dealers carrying on a vigorous campaign for the marketing of current-consuming devices and for the securing of wiring contracts. This had been the means of making it unnecessary for the Boston Edison Company to carry out certain plans they had made for the marketing of fans and irons at attractive prices in order to stimulate the demand for these devices.

Mr. Robertson called attention to the necessity of the "People's Electrical Page" as a means for giving the electrical jobber and contractor a fair chance to advertise to the public with a reasonable expenditure of money. The only way that the proper impression could be made was by the local interests joining hands and buying adequate space in bulk to make a proper presentation. Furthermore, he did not wish to create the impression that the jobbers and dealers proposed that central stations should retire from the business of selling electrical apparatus until the local interests had demonstrated that they could carry on this work effectively. Antagonism on the part of the central station creates direct opposition upon the part of jobbers and contractors.

Mr. Page said that in his opinion co-operation between the local dealer, the supply man and the central station was a purely local question. Co-operation of a national character should be devoted to the carrying out of the ideas that would tend to extend the greater use of electricity among all the people.

Henry L. Doherty said that he was not in favor of the central station merchandizing electrical material. Whether electrical apparatus was sold by the central station, jobber, or the contractor it should be handled at a reasonable profit. He believed that success would be best assured when the selling of electrical material is handled on a strictly merchandizing basis and when the central station devoted itself to the generation and sale of electrical energy. He felt, furthermore, that the matter of selling electrical apparatus depended entirely upon the method involved, and the advertising carried out. As an illustration of what could be accomplished by adopting proper methods, he cited his experience as a manager of the gas and electric light plants at Madison, Wis.

H. H. Cudmore,
Master of Entertainment, Association Island Meeting.

For years it has been the policy of gas companies to give away gas stoves and make free service connections. He felt so strongly that if the people really wanted gas service and the advantages of the service were properly presented to them, that he could sell more gas stoves than had been given away under the old-time methods. In one year's time he had demonstrated this, and by taking two-thirds of the receipts from the sale of the gas stoves he had made such judicious use of this in his advertising campaigns that there had been no room for any question as to the wisdom of his judgment in this respect. So far as his own organization was concerned, Mr. Doherty said that wherever the local dealer, the jobber and the contractor were in a position to stimulate the increased use of elec-

trical energy so that the central station would be relieved of the necessity for doing so, they would be glad to eliminate themselves from the merchandizing proposition. He emphasized very strongly, however, the necessity for the wiring contractors to perform work of the highest character and to install only that class of apparatus that would give the customer the most efficient service, and therefore keep the central station from getting into ill repute with its customers.

Joseph E. Montague, general manager of the Buffalo & Niagara Falls Electric Light & Power Company related his experiences in trying to induce the local jobbers and contractors to make a vigorous campaign for business. He had given this a thorough try-out and the results had been very disappointing. Mr. Montague said that he would be glad to enter into any co-operative arrangement that would insure the central station further opportunity for growth, and that for his part he desired the wiring contractor and jobber to get all the business that would legitimately come their way.

A. C. Einstein, general manager of the Union Electric Light & Power Company, St. Louis, described the methods adopted by his company. They were trying to effect a co-operative plan by which the jobber, local dealer and contractor would help in the campaigns they were planning for the wider use of current-consuming devices. In his mind his company had made some very attractive propositions to the local contractors, but owing either to a lack of co-operation or the proper business acumen, some excellent opportunities had not been embraced.

E. McCleary of the McCleary-Harmon Company, Detroit, Mich., delivered a stirring defense of the electrical contractor. He showed how many of the contractors had started in business in a small way and despite many vicissitudes had fought their way up the business ladder so that it would not be long now before they would be in a position to carry on vigorous campaign for the development of their business. He pointed out that with the central-station interests and the contractors understanding each other better that much good could be accomplished, and that the misunderstandings that had been prevalent in the past were very much the fault of each. Now that a better understanding of the situation was had there should be an elimination of much of the controversy that had clouded the issue heretofore. He esperially voiced his appreciation of Mr. Doherty's frank expressions with regard to the relations of the contractor and the central station.

The discussion was further participated in by Mr. Swope, Mr. Cudmore, G. A. Littlefield of the New York Edison Company, J. W. Howell of Newark, N. J., Mr. Scudder, and H. D. Smith of Cleveland, Ohio.

Mr. Dodd summarized the salient points of the whole discussion, and suggested that in order to get definite action it might be well to create at once the nucleus for a permanent organization.

Mr. Montague immediately moved the appointment of a nominating committee, and Chairman Tait nominated Mr. Montague, George F. Morrison, Ernest Freeman, W. E. Robertson, S. L. Nicholson, and Mr. Dodd as this committee.

Permanent Organization.

The nominating committee retired, and after a brief intermission Mr. Montague submitted the report of the nominating committee, recommending the following committee on organization.

For the Central Stations—Henry L. Doherty, New York city, chairman; J. E. Montague, Niagara Falls; Walter H. Johnson, Philadelphia; A. C. Einstein, St. Louis; John F. Gilchrist, Chicago.

For the Electrical Jobbers—W. E. Robertson, Buffalo, chairman; W. W. Low, Chicago; Roger V. Scudder, St. Louis; F. S. Price, Boston; Gerard Swope, New York city.

For the Electrical Contractors—Ernest Freeman, Chicago, chairman; Ernest McCleary, Detroit; Philip N. Thorpe, Paterson, N. J.; James R. Strong, New York city; G. M. Sanborn, Indianapolis.

For the Electrical Manufacturers—A. W. Burchard, New York city, chairman; L. A. Osborne, Pittsburgh; W. A. Layman, St. Louis; J. Robert Crouse, Cleveland; B. M. Downs, Covington, Ky.

Philip S. Dodd, of New York city, secretary.

The report of the nominating committee was adopted and Mr. Doherty upon accepting the chairmanship said that he would give the movement his very earnest effort and endeavor. He would put it first on his list for results. He thanked the committee and chairman for the honor it had done him, and accepted the responsibility that had been placed upon him, and he hoped that even though the time which he would devote to this work might, if he applied it for himself, make him better off financially, he would feel far better repaid if the work proves a success than he would if the same amount of time devoted to money making should have been the most successful he had ever undertaken.

Before adjournment a vote of thanks was tendered to the Association Island Corporation and to the gentlemen who had made the meeting possible and had contributed to its success.

On Wednesday, September 4, a meeting of the general committee was held when a constitution and by-laws were framed up, based to a considerable degree upon the principles of the Electrical Development Association of 1906. It was decided that there would be a general committee of 37 members representing the various interests in the electrical business. An executive committee of 9 members would act as an advisory board, and the central bureau would be under the direct charge of a general manager, to be appointed.

A meeting of the whole committee will be held in New York, on October 3, to draft further plans.

On Monday evening there was an impromptu concert of vocal selections and instrumental music, supplemented by moving picture films under the direction of Mr. Cudmore. On Tuesday evening Elbert Hubbard delivered a very interesting and entertaining address. The enjoyment of those participating in the meeting was added to by the natural attractions of the Island, many indulging in fishing trips, boating and bathing, and enjoyed the hospitality of the "Dauntless" for a sail among the Thousand Islands.

While the meeting practically broke up on Tuesday, many stayed over until Wednesday evening. The meeting was voted by all present the most successful and remarkable gathering for harmony and co-operation that had ever been a part of the electrical industry. Among those present were the following:

Central-Station Men.

F. M. Tait, Dayton Lighting Company, Dayton, Ohio; H. L. Doherty, New York; A. C. Einstein, Union Electric Light & Power Company, St. Louis; C. A. Littlefield, New York Edison Company; J. E. Montague, Buffalo & Niagara Falls Electric Light & Power Company; W. H. Johnson, Philadelphia Electric Company.

Electrical Supply Jobbers.

Franklyn Overbagh, Overbagh & Ayres, Chicago; N. G. Harvey, Illinois Electric Company, Chicago; E. W. Rockafellow, Gerard Swope, Western Electric Company, New York; W. E. Robertson, Robertson-Cataract Company, Buffalo; Roger V. Scudder, Wesco Supply Company, St. Louis; Z. W. Carter, Pettingell-Andrews Company, Boston; F. M. Bernardin, B.-R. Electric & Telephone Manufacturing Company, Kansas City.

Electrical Contractors.

Ernest Freeman, Chicago; E. McCleary, Detroit; W. H. Morton, Utica; P. N. Thorpe, Paterson, N. J.

Manufacturers.

C. I. Hills, P. S. Klebs, Franklin Electric Manufacturing Company, Hartford, Conn.
B. M. Downs, Hemingray Glass Company, Covington, Ky.
F. S. Hunting, Fort Wayne Electric Works, Fort Wayne, Ind.

H. B. Crouse, Crouse-Hinds Company, Syracuse, N. Y.
F. C. Barrington, B. F. Fisher, Westinghouse Lamp Company.
S. L. Nicholson, G. B. Griffin, J. C. McQuiston, Westinghouse Electric & Manufacturing Company.
Robert L. Jaynes, Pittsburgh, Pa.
G. G. Lockwood, Central Falls Mazda Lamp Works.
L. P. Sawyer, Buckeye Electric Works.
E. H. Haughton, Bryan-Marsh Electric Works.
A. C. Garrison, Columbia Incandescent Lamp Works.
H. C. Rice, General Incandescent Lamp Works.
A. E. Williams, Colonial Electric Works.
H. H. Cudmore, Brilliant Electric Works.
C. O. Brandel, Peerless Lamp Works.
R. E. Gorton, Packard Lamp Works.
H. B. Vanzwoll, Sunbeam Incandescent Lamp Works.
H. W. McCandless, New York.
W. W. VanHorn, Shelby Lamp Works.
F. E. Watts, New York.
National Quality Lamp Division General Electric Company—B. G. Tremaine, J. R. Crouse, A. S. Terry, S. E. Doane, F. H. Blackburn, P. S. Dodd, Glenn C. Webster, P. F. Bauder, N. H. Boynton, W. M. Skiff, C. W. Bender, H. M. Vanzwoll, W. G. McKitterick, H. N. Sibbald.
General Electric Company—A. W. Burchard, A. D. Page, G. F. Morrison, C. W. Stone, F. H. Gale, F. G. Vaughan, M. O. Troy, H. R. Sargent, F. T. Benson, G. C. Osborn, H. B. Rogers, R. D. Parker, H. Schroeder, F. W. Sanford, G. H. Stickney, J. R. Baker, H. B. Wallace, R. G. Henderson, J. H. O'Brien, E. L. Sherwood, R. E. Moore, W. J. Hanley, J. H. Livsey, P. Worth, W. M. Deming, H. C. Houck, E. G. Waters, C. W. Bunnell, E. A. Carolan.

Electrical Press.

E. B. Strong, *Journal of Electricity, Power and Gas*, San Francisco.
H. M. Wilson, *Electrical World*, New York.
Frank B. Rae, Jr., *Electrical Merchandising*, New York.
A. A. Gray, ELECTRICAL REVIEW AND WESTERN ELECTRICIAN, Chicago.

Electric Development Association.

The Electric Development Association, Incorporated, with offices in the Exchange Building, 53 State Street, Boston, Mass., has been organized to bring together the electrical interests of New England. It is proposed to secure united action of all concerned in the belief that if everybody interested in the business works together the resulting amount of business for each will be very much larger than secured in the past without co-operative work of the various interests. The association is receiving the active support of the New England central stations, the manufacturers of electrical apparatus and appliances, the New England electrical contractors, and the New England jobbers. The officers are president, Frank S. Price, Pettingell-Andrews Company, Boston; first vice-president, Alfred J. Hixon, Hixon Electric Company, Boston; second vice-president, S. B. Condit, Jr., S. B. Condit, Jr. & Company, Boston; secretary, Zenas W. Carter, Boston; treasurer, Guilford M. Stuart, Stuart-Howland Company, Boston.

The executive board consists of the following: W. M. Adkins, Edison Electric Illuminating Company, Boston; H. B. Gilmore, Western Electric Company, Boston; V. C. Bruce Wetmore, Wetmore-Savage Company; Herbert S. Potter, Herbert S. Potter; John B. Ward, Ward-Drouet & Foster, Incorporated; W. C. Clark, Clark & Mills Electric Company.

Electric Fans in the Orient

Ceiling fans are proving very popular in China, as they give an effect similar to the old-fashioned overhead fans operated by a coolie.

There is little demand in that part of the world for desk fans, and what demand there has been is giving way to the ceiling variety. Current from desk fans has been found too intense and not well enough sustained for use in a heavy humid atmosphere. For the same reason the use of ceiling fans of high speed and narrow radius is not very successful. The best type of fan for that part of the world is a wide-radius, slow-speed, two-blade fan with simple motor, as near foolproof as possible. Fans are used steadily in Hongkong and other ports in a similar latitude for about seven months in the year. The use of fans in the near future will doubtless increase rapidly.

Of the electric fans now being sold in Hongkong, American fans have the preference, because they can be secured there at prices below those of other nations for similar goods. The actual volume of the trade can not be indicated in definite figures. Its general drift appears from the fact that the value of imports of electrical fittings and materials into all China increased from $915,596 in 1910 to $1,094,403 in 1911, in spite of the incidence of war and revolution. Hongkong itself probably will import and use an additional $200,000 worth of such goods. The present annual import of fans alone into Hongkong will probably reach a value of from $22,000 to $25,000. Hongkong's electric light and power service calls for fans and similar apparatus suited to a single-phase current of 100 volts with a frequency of 72 cycles per second.

Large Hydroelectric Project in Italy.

A special government commission has recently made a report on the industrial and economic development of Calabria, Italy, especially with regard to the construction of three vast reservoirs in the Sila district. The projected works would seem to be of exceptional importance and their execution of no great difficulty, owing to the formation of the land and its adaptability to conversion into vast artificial lakes.

The three basins are to develop together a force of more than 160,000 horsepower, which should provide ample power for electric lighting, traction, tramways and railways and railways in Calabria, Basilicata and Puglia, as also for any other important industries which may be created in the neighborhood. Furthermore, the water collected will serve to irrigate large tracts of the surrounding country, and finally, by storing up the water, it would be possible to develop the course of the River Neto, on which project the State has already proposed an expenditure of $1,250,000.

These enormous works, which are estimated to cost some $12,500,000, are to be executed by private enterprise, without any intervention on the part of the Government, whose intention, however, it is to further the scheme as much as possible. By the execution of this vast program enormous advantages would accrue to the provinces of Calabria.

New Municipal Subway System Proposed for Chicago.

Another elaborate report on the problem of providing a system of transportation subways in Chicago has been made, this time by the Chicago Harbor and Subway Commission and a subcommittee of the City Council Committee on Local Transportation. It contemplates a comprehensive system of municipal subways entirely distinct from the present surface and elevated traction lines. Five main and four branch lines, partly two and partly four-track, making a total of 56.42 miles, is planned in this latest project. The estimated cost of construction is $96,257,000 and of equipment $34,844,000, thus involving a total expenditure of $131,101,000. No definite plans for financing such a project are recommended, although the securing of both private and public capital is discussed. The capacity of the system is estimated at 180,000 seats an hour in steel cars seating 60 passengers each. A third-rail direct-current system of propulsion is contemplated.

Opportunities for Electrical Trade With Spain.

The German consul at Barcelona, Spain, states that there is a large demand in Spain for electrical apparatus, such as dynamos, motors, incandescent lamps, transformers, etc., and that there are excellent opportunities for doing business, especially in the case of the lighter machines weighing up to 800 pounds, as well as in the case of small electric appliances and fittings. Particularly noticeable is the great increase in the use of electric incandescent lamps, in which it is stated that there is a large import trade to be done, in spite of the increasing number of works manufacturing these articles in Spain.

Pennsylvania Electric Association.

Fifth Annual Convention, Bedford Springs, Pa., September 3, 4, 5 and 6.

Charter members of the Pennsylvania Electric Association who have attended every meeting of the organization are unanimous in pronouncing the fifth annual convention, held at Bedford Springs, Pa., September 3, 4, 5 and 6, the most enjoyable and profitable affair so far held. Bedford Springs is a famous summer resort situated among the eastern ridges of the Allegheny Mountains at an elevation of about 1,200 feet and unlimited diversions are provided in the way of sports and recreation. These did not, however, detract from the interest and attendance at the business sessions, all of which occasioned profitable and interesting discussions of the subjects considered. The total registration was somewhat over 250.

The convention was formally opened on Tuesday evening by a reception to President R. S. Orr, of Pittsburgh. Mr. Orr was assisted in the receiving line by the other officers and chairmen of committees. A dance concluded the function.

The first business session was called to order shortly after 9 o'clock on Wednesday morning by Mr. Orr. Roll call and reading of the minutes of the last convention were dispensed with and the annual presidential address presented. In this President Orr called attention to the work that has been accomplished by the Association during the past year, and also to the progress that has been made in the electrical industry. He spoke particularly of the effort and expense incidental to collecting data for presentation before the society and recommended that the possibility of establishing a fund for carrying on this work be considered. In commenting on the work of the Association Mr. Orr mentioned that the Pennsylvania organization was the oldest and largest geographical section of the National Electric Light Association. He said that the national body had rendered great assistance during the past year which has contributed greatly to the advances made during that time. In conclusion Mr. Orr referred to the allied interests of railway, telephone and telegraph, and central-station companies in the matter of pole-line construction and privileges and strongly recommended that a committee be appointed by the next administration to confer with the interests named, having for its object a closer and more harmonious agreement in the matter of exchange of pole-line privileges.

E. H. Davis, of Williamsport, moved that a committee be appointed to consider the recommendation of Mr. Orr. The motion was carried and the report of the Program Committee was then presented by Thomas Sproule, of Philadelphia.

W. A. Donkin, of Pittsburgh, as chairman of the Entertainment Committee then presented a report thanking the manufacturers for the various prizes contributed for the contests held.

The report of the Executive Committee was presented by Van Dusen Rickert, vice-president. During the year the Committee held five meetings at which various Association business was transacted. A new standing committee on exhibitions was created.

Walter E. Long, of Philadelphia, presented the report of the secretary-treasurer which showed an appreciable gain in membership of all classes, the total on September 1 being 1139. The financial report showed the Association to be in a sound financial condition.

Other reports presented were of the Committee on By-Laws, Membership Committee and Lamp Committee. The report of the latter was presented by C. W. Ward, of Pittsburgh and comments at some length on the report of a similar commitee of the National Association. It states that from replies received from member companies the new drawn-wire or wire-type lamp has proven much more satisfactory than the old types. The most important improvement in the present type is the introduction into the lamp of certain chemicals, placed on or in the lower stem supporting the anchors. This treatment, it is claimed, especially in the lamps of high wattages, has improved the maintained candlepower. The Committee reports improvements in the five-watt sign lamps which will eliminate the difficulties heretofore encountered. A 10-watt sign lamp is on the market which can be substituted for the carbon lamps without change in wiring. Tantalum lamps are decreasing in popularity and carbon-filament lamps are being largely replaced by Gem. The report comments briefly on the new nomenclature agreed upon for lamp bases and concludes with the recommendation that all lamps be tested upon receipt from the manufacturers.

The discussion was opened by W. L. Roberston, of Philadelphia, who stated that when an installation of large units is to be made the wiring expense is greatly increased by the fact that the Underwriters' rules prohibit more than 660 watts to a circuit. Thus if 500-watt lamps were to be installed, for instance, a separate circuit would have to be run for each lamp. He recommended that lamps be placed on the market rated in multiples of 660 so that a circuit could be fully loaded. These lamps could supplement those already on the market.

E. F. McCabe, of Titusville, thought that if would simplify matters if the Underwriters' rulings were changed as he saw no reason for establishing the capacity of a circuit at 660 watts.

E. E. Wendle, of Williamsport, recounted his troubles with series tungsten lamps and asked if other companies had experienced difficulties. He also spoke of the 25-watt tubular lamp, mentioned in the report, stating that the cost of renewals is excessive.

H. N. Muller, of Pittsburgh, stated that the rapid blackening of the series tungsten lamps necessitates such frequent inspection that the cost is almost prohibitive.

C. W. Bettcher, of Harrison, N. J., explained that the blackening of series lamps reported by the previous speakers was being largely overcome by the use of the chemicals referred to in the Lamp Committee's report. This chemical uniting with the tungsten forms a transparent instead of a black coating on the lamp bulb. Regarding the tubular lamp, Mr. Bettcher stated that the smaller bulb area was responsible for the comparatively rapid discoloration of this type lamp.

A. R. Granger, of Chester, reported that he is experiencing considerable trouble in operating tungsten lamps on the same circuits with four-ampere magnetite arc lamps, supplied from a rectifier, and asked if this trouble is found generally.

Thomas Sproule, of Philadelphia, answered that no difficulty will be found if the incandescent lamps predominate on the circuit. Mr. Muller said that no troubles have been noticed in Pittsburgh. It seems that excessive blackening is only encountered when tungsten lamps below 400 watts in size are used.

The next report was that of the Committee on Overhead Line Construction, which was presented by H. N. Muller, of Pittsburgh. This report is divided into three parts, dealing respectively with the inspection of electric light and power company's pole lines; a discussion of low-tension distribution showing how it is done, what it cost, and what it did; and recent developments in transformer hanging. The first section points out the im-

portance of a rigid inspection of electric light and power lines and a systematic recording of results of same. The lack of attention to inspection, with subsequent accidents, has resulted in railroad companies demanding a prohibitive factor of safety in structural and electrical details to guard against continued depreciation that should otherwise be checked by periodic inspection. Furthermore, it is pointed out that reasonable inspection and maintenance will give the central-station operator better standing in the courts and tend to offset the antagonistic attitude of the public. Inspection of overhead line construction should cover and record (1) improper setting of poles as to location, depth and alinement; (2) failure of foundations by landslides, washouts, etc.; (3) insufficient dimensions for burden or side stress; (4) weakening by decay at and below the ground line; (5) weakening by decay at the heart; (6) weakening by decay or other causes above the ground. Detailed information and instructions are given for the proper inspection along these lines.

The section of the report discussing low-tension distribution advocates the grouping of a number of service connections on the same transformer and describes graphically the combination of ideas used in a practical case. In conclusion, attention is called to the report of the National Committee on the Grounding of Secondaries, the substance of which is that every low-tension lighting service connection should be grounded. Low-tension network distribution makes this safeguard highly practical, and a few ground connections of the most approved form can be installed and maintained with the highest economy.

The section devoted to recent developments in transformer hanging points out that the aggressive campaigns carried on by the new-business departments in securing industrial power customers has necessitated a need for the best character of construction, as to arrangement of apparatus and kind of material, in order to meet the demand for reliable service. The results sought in the development of this work were: (1) A greater factor of safety; (2) expeditious replacement of parts; (3) a minimum cost of material, and (4) improved appearance of construction. Diagrams and illustrations of typical modern installations form the larger part of this report.

Mr. Muller, after presenting this report, referred to the recommendation made by President Orr, to the effect that a committee be appointed to co-operate with railway and telephone companies in the matter of overhead construction. He said that reasonably good construction and thorough inspection is all that is demanded by foreign companies when central stations desire to cross their lines. In the smaller companies, however, trouble is often encountered in reaching the proper officials for permission to cross lines. This is often of great inconvenience, as in numerous cases the possibility of securing business depends upon the rapidity with which the central station can make connection to the customer's premises. A delay in such a case is disastrous.

Mr. Francis, of the Bell Telephone Company, of Philadelphia, spoke briefly regarding the position that telephone companies take in granting central stations permission to cross their lines. The practice of the Bell Company is to inspect pole lines thoroughly and periodically, in a manner similar to that outlined by the Committee. After each inspection a line crew covers the same territory as the inspector, making repairs without delay. He stated that while these periodical inspections were of course essential, the best results had been obtained from special inspections made by foremen, division superintendents, etc.

G. E. Wendle, of Williamsport, spoke of having trouble with construction crews sent out by the telephone companies from headquarters. A satisfactory working agreement has been made, how-

Group at Convention of Pennsylvania Electric Association.

ever, with the local telephone company, and no trouble is encountered from this source. Mr. Wendle also mentioned a scheme which he had originated for indicating to inspectors when a previous inspection had been made of a pole. A small nail, having the date imprinted on the head, is driven into a pole or cross arm after each inspection.

J. H. MacDonald, of the Pennsylvania Railroad, spoke briefly, emphasizing the willingness of his company to co-operate to any extent with central stations. He said that regardless of the necessity for rigid inspection from the service standpoint, the new Employees' Liability Act offers an incentive for maintaining the highest factor of safety. In reply to a question of Mr. Davis as to the possibility of revising present specifications of the Pennsylvania Railroad for overhead construction crossing a right-of-way, Mr. MacDonald said that the company is very willing to make any revision when the wisdom of such change is demonstrated.

L. H. Conklin, of Warren, closed the discussion, pointing out that overhead line construction can be worked out satisfactorily in each individual case, but the question which should engage the attention of the committee is that of co-operation between the various public-utility companies involved.

At this point President Orr appointed a nominating committee, composed of C. J. Russell, of Philadelphia, L. H. Conklin, of Warren, and G. E. Wendle, of Williamsport.

Before adjournment, A. R. Granger, of Chester, called the attention of the Association to the fact that the day was the thirtieth anniversary of the operation of the first commercial Edison dynamo and moved that a suitable telegram of congratulation be sent to Mr. Edison. The motion was adopted, and Secretary Long instructed to send the message.

Thursday Session.

The first business of the session on Thursday morning was a paper and demonstration of the Schafer Prone Pressure Method of Resuscitation from Electric Shock, by C. A. Lauffer, of Pittsburgh.

Resuscitation.

Dr. Lauffer's valuable paper opens with a discussion of the conditions under which resuscitation is effectual and the necessity for having a working knowledge of a good method of artificial respiration. The method described in the paper is known as the prone pressure, or Schaefer method, and provides for placing the patient flat on his stomach and inducing respiration by applying pressure, at regular intervals, to his lower ribs. Illustrations showing the operations to be performed are reproduced in the paper and considerable valuable information which should be known in case of emergency given. The paper is concluded with extracts from papers on the method of resuscitation under consideration.

Following the reading of this paper, Dr. Lauffer instructed numerous delegates in the method under discussion, and gave all an opportunity to observe how each operation should be conducted. H. P. Liversidge, of Philadelphia, emphasized the necessity for promptness in starting treatment after an accident. Death from electric shock, he said, is often due to the fact that the patient is usually removed to a hospital and a considerable time elapses before he is given the attention that should be given immediately. He also pointed out that the number of safeguards should be increased to avoid accident. Numerous questions relative to minor points were asked by Messrs. Van Winkle, Muller, Kellogg and McCabe.

F. M. Tait, President of the National Electric Light Association, who was scheduled to address the meeting, was unable to attend, but T. C. Martin, secretary, was present and delivered a very interesting extemporaneous address on general matters relating to Association work. He commented upon its growth, particularly in the western country, which is a result of holding the annual convention in Seattle. The number of company sections has also been substantially increased and new ones are at present being formed. Of the geographical sections, the Pennsylvania State Association is the oldest and largest, but Mr. Martin said that it is hoped the Ohio Association will vote favorably in regard to affiliation, which would make that section the largest. Mr. Martin referred to the various publications gotten out by the national body, commenting particularly upon the Meterman's Handbook and the Commercial Section Digest. In conclusion he referred to the new policy which the Association intends adopting relative to the publication of proceedings.

The paper entitled "Dollars and Factors," by C. J. Russell, of Philadelphia, was then taken up. This is a very excellent treatise on the relations between dollars and those factors affecting the economic results of their utilization, with special reference to public utility. Points discussed include load-factor, diversity-factor, power-factor, the ratio of expenses to gross earnings, and points of commercial importance. Further treatment of this paper will be given in a subsequent issue.

In reply to a question by Mr. Davis as to the relation between the connected load in kilowatts and the maximum station demand, Mr. Russell said that about 40 per cent of the added connected load will appear in the station demand. Mr. McCabe, of Titusville, stated that his experience has been that for every 110 horsepower increase in connected loads, the maximum demand has increased 40 kilowatts.

The paper by Messrs. McKirdy and Wood, of Pittsburgh, entitled "The Wiring of Already Built Houses," was then presented. The first part of this paper, by J. E. McKirdy, deals with the advertising campaign for new business conducted by the Allegheny County Light Company, of Pittsburgh. Details of this campaign are given, and numerous sample advertisements which appeared in the daily papers reproduced. Part 2, by H. H. Wood, describes in detail the methods of the company in regard to the wiring of old houses. This paper is published elsewhere in this issue.

It was stated in reply to a question, that in 1910 one thousand houses were wired in Pittsburgh as a result of the Allegheny County Light Company's campaign. On this business a net loss of $4,000 was sustained, but the company considers the investment a good one, in view of subsequent business. The final paper of the session, entitled "Automatic Feeder Regulators for Out-of-Door Service as Applied to Single-Phase Lighting Circuits," by F. W. Shackelford, of Schenectady, N. Y., in the absence of the author, was presented by Mr. White. This paper describes and illustrates a new, small, compact, out-of-door, automatic feeder regulator which is designed for 60-cycle, 2,300-volt, single-phase circuits, for 10 per cent boost and buck, and with current capacity of 10, 15, 20 or 25 amperes. Information regarding method of installation was also given.

H. P. Liversidge, of Philadelphia, opened the discussion, calling attention to the desirability of a cheaper method for regulating alternating-current circuits, as described in the paper. He thought that it should be possible, however, to combine the features of this new regulator with the regular inside equipment and thus reduce the cost of the latter.

Friday Session.

At the opening of the session on Friday morning Vice-President Rickert announced the names of the nominees for membership on the newly created Public Utility Interconstruction Committee. These were Messrs. Davis, of Titusville, Sproule, of Philadelphia, and Muller, of Pittsburgh.

The paper by B. F. Day, of Philadelphia, entitled, "Welfare Work" was then presented.

Welfare Work.

Mr. Day points out that it is decidedly important that every effort be extended in bringing about closer and more satisfactory relations between operating electric light and power companies and their employees, for without a general inauguration of welfare work the central-station industry as a whole cannot enjoy the same degree of prosperity and the same high regard in the public mind that it otherwise would. Welfare work is just as important for the smaller companies as the large and can be carried on through a grouping that will admit of the development of the idea on a co-operative basis.

Mr. Day suggests that the companies forming the Pennsylvania Association could, through a regularly organized co-operative plan, take up such divisions of welfare work as (1) accident and sickness insurance; (2) death benefits; and extend the work along other lines after the fuller development of the work mentioned.

A general outline of the plan, which is successfully employed by the Philadelphia Electric Company, is given by Mr. Day. The salient points are:

(1) *Organization.* Any grouping of companies would be feasible, either as a local combination of member companies or on the basis of a combination of any number of the small companies included in the membership of a state association. The latter would seem the most logical. (2) *Administration.* Administration of the association should be by a board of governors, in part chosen by the employees of the various companies and in part appointed by the member companies co-operating in the plan. (3) *Fees, dues and assessments.* Each employee should pay a membership fee of one dollar. Each member should pay monthly dues amounting to one per cent of his monthly rate. Each member should pay an assessment not exceeding fifty cents upon the death of each member. Each employing company should contribute an amount equal to the total amount contributed by the employees of such company. All fees, dues and assessments should be collected through the pay-roll of the several companies and forwarded to the officers chosen to administer the fund. (4) *Accident benefits.* For injuries received either while on duty or off duty, full regular pay for a period of 10 weeks, which period may be extended in cases of prolonged disability, if the officers believe the case to be meritorious. Separate accidents should be paid for without reference to preceding periods of disability. Accident benefits should be paid for the exact number of days off duty, even though less than one week. Accident benefits should be paid regardless of cause or blame, in all cases of injury received in the performance of duty. (5) *Sickness benefits.* Should be paid on the basis of one-half regular pay for a period of 10 full weeks for any one disability. Sick benefits should not be paid for a shorter period than one full week, but should be paid for any fractional part of a week exceeding that period. Separate cases of sickness should be paid for, independent of any preceding periods. (6) *Death Benefits.* The entire amount contributed through the assessment of the employee members, plus the contribution of the member companies, should constitute the death benefit, payable to the beneficiary of the deceased member. Thus with a membership of 1,000, the contribution of the membership would equal $500, which amount would be duplicated by the contributions of the member companies, providing a total death benefit of $1,000. This benefit should be paid for deaths resulting either from natural or accidental causes. It will be noted that the contribution of the employee is based on a definite per cent of his fixed rate, and that his compensation during disability is on the same equitable basis; also that the contribution of the member company is based on the contribution of the employees of its own company. Therefore it is apparent that the method is one of perfect equity alike to employee and to employing company. *Miscellaneous.* The rules governing such an organization may be of simple form, covering only such matters as will insure a perfect understanding as to what the association requires of its members and what it agrees to pay. The working forms may likewise be simple—though sufficient in detail—and should be forwarded to the officer chosen to carry on the work of the association, and after proper records are made, payments should be made from the funds of the association. Experience with a changing membership of nearly two thousand has demonstrated the practicability of the plan and shown that the work involved is not material when compared with the results obtained.

George H. Hoffman, of Philadelphia, spoke at some length on the relations between company and employees in Philadelphia. There is no friction, every employee working for the interest of his employer.

Henry Harris, of Wilmerding, thought that the time will come when it will be necessary to set aside a certain sum for depreciation of labor just as it is now necessary to set aside a fund for the depreciation of machinery.

Van Dusen Rickert,
President-Elect, Pennsylvania Electric Association.

He spoke strongly in favor of welfare work and said the smaller companies could take this up as well as the larger companies.

L. R. Dutton, of Wynoote, stated that the work as outlined by Mr. Day was being carried on in Wynoote with very gratifying results. This instance indicates the feasibility of welfare work in the small company.

Mr. Titzel, of Lancaster, spoke of the welfare work there. Each of the 500 employees of the company pays 40 cents a month to the relief association. In case of death $150 is paid and in case of sickness an indemnity of 75 cents per day is given. Any employee that is injured in the service is given one month's salary and then placed on the relief fund list. A company doctor is employed who treats all employees and their families free. A welfare secretary is also employed who has charge of the employees' club, library, etc. The entire work has been very successful and does not cost the company over $1,000 per year.

Henry Harris suggested that some provision should be made for having the Association carry out the recommendations made in the various papers presented.

Following this discussion a motion was made and carried to the effect that a committee be appointed to study the question of welfare work.

The next two papers, "Purchased Power—Its Advantages vs. Its Cost," by A. E. Rickards, of Pittsburgh, and "Power-Factor—Its Effect on Operation and a Means for Its Improvement," by F. N. Jewett, of St. Louis, were presented and discussed jointly. The former, which was presented by G. E. Wendle, will appear in a subsequent issue.

The paper by Mr. Jewett dwelt on the advantages of high power-factor and discussed the effect of power-factor on generator capacity, field current and rotor loss, and regulation. A considerable portion of the paper was devoted to a description of the new unity-power-factor motor manufactured by the Wagner Electric Manufacturing Company.

These papers were discussed by Messrs. Davis, Wendle, McCabe, Tripp, Conklin and Russel. Mr. Davis expressed his attitude as being that of not wanting to enter into a contract with the ability of doing the prospect good. Mr. Wendle brought out the point of increasing the production capacity of dollars from the customer's standpoint. Mr. McCabe brought out a very interesting point in the feature of cutting out transformers and giving primary service on motors wherever possible. Mr. Tripp called attention to the desirability of loading existing lines and increasing the productive capacity of a system. Mr. Conklin spoke at some length on the work of the Rate Research Committee of the National Electric Light Association.

At the conclusion of this discussion numerous resolutions were adopted conveying thanks to those responsible for the success of the convention. The Nominating Committee then reported the following names for officers for the ensuing year:

President, Van Dusen Rickert, Pottsville.

Vice-president, D. T. Campbell, Scranton.

Secretary, W. E. Long, Philadelphia.

Treasurer, W. C. Anderson, Plymouth.

The new members of the Executive Committee are W. R. Kenney, Thomas Sproule, E. F. McCabe, and N. H. Spencer. All the above were duly elected by unamimous vote.

New Electrical and Mechanical Appliances

A New Type of Galvanometer Lamp and Scale.

The lamp and scale illustrated in Fig. 1 has two important distinguishing features. First, it is very easily read, and second, it is compact and requires no space upon the instrument table. The spot, or rather line, of light is brilliant enough to be easily seen in a light room. The "spot" is thrown directly upon a paper scale, and thus can be seen from an angle. Those who have used translucent scales will appreciate the advantage of the latter point, for with such scales the observer must be practically in front of the scale in order to see the "spot." As will be seen from the illustrations the lamp and scale are mounted directly upon the front of the galvanometer, thus economizing space. This also makes adjustment easier, since the operator has both the galvanometer and lamp and scale in front of him, and does not have to move from one to the other during the process of adjustment.

This lamp and scale may be mounted upon any Leeds & Northrup galvanometer, provided it is equipped with a plane mirror. Since all Leeds & Northrup galvanometers with which telescopes and scales are ordinarily used are provided with plane mirrors, this lamp and scale may be used with such instruments without any change being necessary. For those galvanometers which are equipped with concave mirrors, plane mirrors can be provided in place thereof.

The lamp and scale consists of a frame upon which are mounted a low-voltage incandescent lamp, a lens, a total reflecting prism, a mirror held in an aluminum frame, and a one-half-meter scale. The operation of the instrument will be readily understood from an inspection of Fig. 2. The lamp provided with this instrument has been especially designed and constructed for this purpose. It has a single straight filament of high intrinsic brilliancy. It operates on 4 volts and requires a current of 0.5 ampere. It may be operated either from a storage battery or from an ordinary lighting circuit. If run from a lighting circuit a fixed resistance must be put in series with the lamp. If a number of galvanometers are in use in a laboratory, the lamps may all be connected in series, and only one resistance unit used for all, this unit being of proper resistance to protect as many lamps as are in the circuit. Several inches of flexible cord are attached to the lamp socket. On the end of this cord is a double plug connector. Thus, if it is desired to remove the lamp and scale when permanent wiring has been installed, it may be done without disturbing the wiring.

The Leeds & Northrup Company,

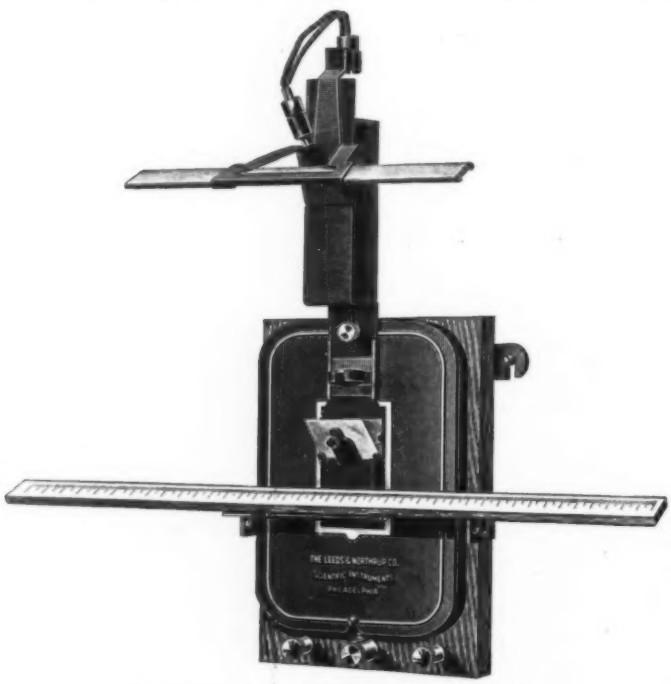


Fig. 1.—New Lamp and Scale for Galvanometer.

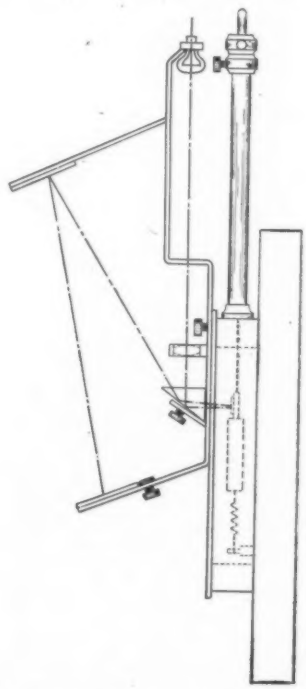


Fig. 2.—Diagram of Optical System.

4901 Stenton Avenue, Philadelphia, Pa., is now prepared to furnish this type of lamp and scale.

Test of Electric Drill.

The Standard Electric Tool Company, Cincinnati, O., recently had some tests made at the University of Cincinnati upon a Standard half-inch 110-volt electric drill. The test was carried out by A. H. Stewart and was attested by A. M. Wilson, professor of electrical engineering. The tests were made by placing the electric drill in an upright position under the spindle of

a drill press and the press feed used to force the drill against the work. The material drilled was steel and the depth of the hole cut was two inches in each case.

DATA OF TEST.

Test No.	Volts.	Watts.	Time in Seconds.
1	95	Note	52
2	110	450	67
3	120	650	35

Note: The watts of the first test varied owing to the varying load on drill as the feed was too rapid to be regular.

Tests Nos. 1 and 3 were made under unfavorable circumstances. No. 1 being made at low voltage, the drill being worked very hard, and No. 3 made at abnormally high voltage with the drill again worked much harder than in regular practice. In neither case was the drill damaged at all, either by the high mechanical strains or by overheating.

Test No. 2 was made under normal conditions as to voltage and load, such as the drill would experience in regular service. It is to be noted that even at the reduced pressure of 95 volts the drill was advanced at the rate of one inch in 26 seconds.

Weatherproof Protective Equipment.

The rapid development of high-tension distribution systems employing pressures from 6,600 to 66,000 volts has demonstrated the necessity for new types of reliable protective apparatus,

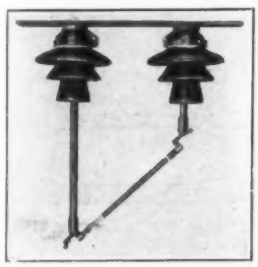


Fig. 1.—33,000-Volt Weatherproof Fuse and Mounting.

which can be installed at such a cost as to keep the investment at a minimum.

Realizing the demand for a complete line of weatherproof high-tension fuses for use in protecting individual transformers or small substations, the Delta-Star Electric Company, Chicago, Ill., has, after a long series of tests, announced a new line of mountings for fuses of the type shown in Fig. 1. This new type of mounting is especially suited for mounting directly on the under side of cross-arms. For use in controlling the circuit, an under-hung disconnecting switch of the type shown in Fig. 2, has also been developed.

The fuses used are known as the S. & C., and it has been demonstrated that they rupture the circuit with remarkable rapidity, in fact, more quickly than is possible with the average oil circuit-breaker. In view of the large number of outdoor substations now under construction, this new development in weatherproof switches and fuses will be of peculiar interest to central-station managers.

An Improved Method of Packing Incandescent Lamps.

Decided changes in standard practice as regards the style of carton used for packing Mazda lamps have just been put into effect by certain prominent incandescent-lamp manufacturing interests of the United States. The new style of packing which is described in detail below, calls to mind the fact that there has been steady progress in the methods of preparing incandescent lamps for shipment since they first became a commercial product. Originally, lamps were wrapped in tissue-paper, packed in hay or straw and shipped in ordinary barrels; breakage was high, the packing process was slow and difficult, errors in counting the number of lamps in the shipments were not uncommon, and the arrangement was generally unsatisfactory. The barrel method of packing was practically abandoned in favor of the standard-package box or case method about seven or eight years ago, and lamps were then placed in unfaced corrugated strawboard sleeves and symmetrically packed in specially constructed wooden boxes. With the advent of the metal lamp, which at first was exceedingly fragile, the style of wrapper used on individual lamps had to be changed. Folding pasteboard cartons were introduced and each carton as prepared for shipment contained not only the lamp, but also a generous supply of cotton wadding around the latter in order that mechanical jars might be absorbed thereby. With this method of packing, which also included the provision of excelsior between the pasteboard cartons and the containing wooden standard-package box, and plenty of cautioning labels on the outside of the package, breakage in transit was reduced to less than one per cent before the introduction of the drawn-wire type of lamp. With the advent of the latter type, last year, it was soon discovered that the cartons could be materially simplified and improved along a number of different lines.

As a result of careful investigation, thorough examination of literally hundreds of different samples of cartons, tests on the most promising samples by competent engineers, and mature deliberation by the lamp manufacturers, who have also consulted with many of the large agents of their product, Mazda lamps are now being packed in "unit" cartons each containing five lamps. Since the number of lamps in a standard package is almost always some multiple of five (5, 100, etc.,) lamps can be shipped in the same quantities as hitherto, but will be contained in the new five-lamp cartons instead of in single cartons as formerly. Furthermore, a strong double-faced jute and jute-corrugated package has been substituted for the wooden box as an outer container, with a reduction of from 14 to 18 per cent in the gross weight of package and lamps. The combined effect of the new cartons and the new outer boxes has been to reduce the gross weight of package and lamps by about 40 per cent.

Regular multiple lamps in the ordinary commercial voltages and in wattages from 15 to 60 inclusive (both pear-shaped and round-bulb types, with the single exception of the 60-watt *round*) are being put up in the five-lamp cartons. The carton for five 15-watt lamps

Fig. 2.—33,000-Volt Weatherproof Locked-Type Disconnecting Switch.

measures 9.88 by 2.25 by 4.88 inches—about the size and shape of a large brick or tile—while the five-lamp, 60-watt carton measures 12.5 by 3.25 by 7.38 inches. The five lamps are placed side by side in the cartons alternately tip up and base up, each lamp being surrounded by a corrugated wrapper or sleeve similar to those in which carbon lamps have been packed. Wadding is eliminated.

As put out by the various works of the National Quality Lamp Division of General Electric Company, the five-lamp carton bears on one of its large faces the words "National Mazda, The Quality Lamp," with an ornamental design in two colors, illustrating the lamp. On the top flap of the carton

is the patent notice and on one of the ends appears the name, monogram, or characteristic emblem of the particular brand of lamps contained. This end also carries a label identical with the type-label on the lamps themselves, giving the rating in watts and volts. The flaps of the carton are sealed, in order that the consumer may have evidence that the lamps have not been changed or tampered with since leaving the factory. This, of course, is a protection to the agent or central station handling the lamps as well, and does not prevent the latter from opening a carton in sight of the ultimate consumer, if desired, in order to demonstrate that the lamps distributed are intact.

Possibly the greatest benefit of the new method of shipment is the convenience afforded to agents in the handling of cartons from the time they are removed from the corrugated package in which they are received until they are placed upon the retail shelves. It frequently happened that the small single cartons were dropped owing to the attempt to carry too many cartons at the same time in one's hands, or to a string giving way, etc., with disastrous results to the lamps in some cases. With the five-lamp cartons the danger of dropping is much decreased, and inasmuch as lamp breakage now consists mostly in breakage after the package is unpacked and not in breakage during shipment, this means in effect that breakage is now practically eliminated.

Such severe tests as the rolling of full packages of lamps down a long iron staircase have been conducted and indicate that lamps packed in the new way should pass safely through all the rough handling that the outer corrugated package will stand without breaking apart. This, of course, is not inconsistent with the statement that packages of incandescent lamps should always be handled with extreme care by the agent.

The space economy of the new carton arrangement is great: for example, five 25-watt lamps in one of these cartons will occupy only 27 square inches on the dealer's shelves, while five of the old 25-watt cartons occupied at least 45 square inches: a saving of 40 per cent in shelf room. In addition, owing to the provision for wadding, the old 25-watt carton stood 0.25 inch higher than the new.

The change, it is believed, is one that will appeal particularly to the trade, for it was largely due to the insistent demand of agents handling incandescent lamps for a multiple carton that this feature was introduced. The new scheme should not only increase retail sales and decrease breakage from the receiving room to the counter, as above indicated, but it does away with a good deal of the annoyance hitherto experienced in connection with disposing of the large amount of waste material used for packing. It also facilitates the taking of lamp inventories, since it is in general much easier to count up 100 lamps by counting 20 of the five-lamp cartons than by counting 100 single cartons.

From the consumer's point of view the five-lamp cartons afford a safe and easy method of carrying several lamps from the electrical supply house to his premises. The tendency will be for the residential consumer to keep a carton of lamps on hand as a provision against burn-outs or other breakage of lamps in service, a tendency which manifestly benefits the central station as well as himself. In other words, the number of empty sockets and sockets containing burned-out lamps, which are left in merely to preserve the appearance of the lighting fixture in many residences, will be considerably decreased.

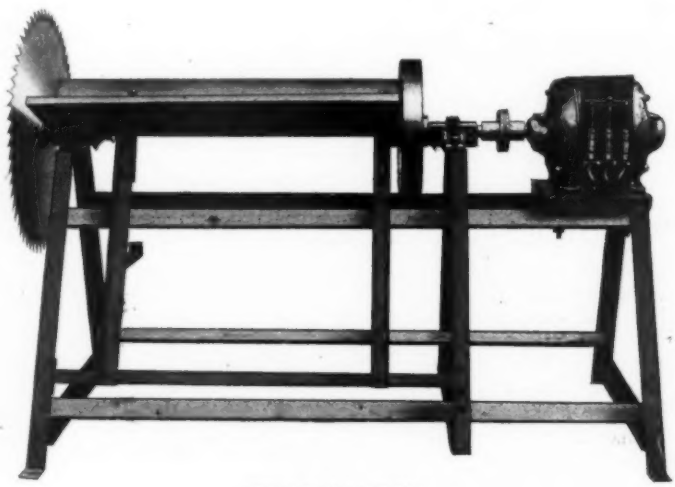
The thousand or so of salesmen who are specializing on incandescent lamps, either in direct connection with the lamp manufacturers or their agents, will also feel the benefits of the new-style carton, since it will decrease complaints and dissatisfaction on the part of their customers, and also because it gives them—what every salesman is always looking for—a number of new, strong talking points.

The method by which metal-filament lamps are packed in the new cartons is in itself a demonstration of the comparative non-fragility of lamps of the drawn-wire type, and the attractive design of the carton furnishes a tangible basis for the emphasizing of that usually invisible though essential characteristic—high quality in incandescent-lamp manufacture. In every way the new departure is a progressive move.

An Electric Saw Table for Wood Yards.

There are many parts of the country in which cordwood is still abundant and therefore largely used for fuel. One of the high elements in its cost has been the expense of cutting it into convenient size for firing. To reduce this cost and labor item to a minimum, F. W. Walter, 33 Atlantic Street, Norfolk, Va., has invented and placed on the market an electric saw table which is particularly suitable for woodyards.

A five-horsepower motor is mounted on one end (usually the left) of the angle-iron frame. Directly connected to it through an insulated coupling is the saw shaft on which are mounted a heavy and well balanced flywheel and a 30-inch Disston saw. The speed of the saw is 1,800 revolutions per minute, which has been found to give the best results. The motor is thoroughly insulated from the frame. A fused starting switch is conveniently mounted on the motor, so that the operator can instantly start or stop the saw without leaving the machine. Self-oiling bearings are used and those on the motor are made specially dust proof. The swinging frame is very easily manipulated; the oak planks for its trough can be readily replaced.



Electric Saw Table.

By the elimination of belts and gears considerable power is saved and simplicity of equipment and operation attained. It has been found that a cord of wood can be sawed four pieces to the stick with an energy expenditure of one kilowatt-hour. This, at the usual rates prevailing, is from 25 to 50 per cent cheaper than any other method in use. The compactness of this table results in a decided saving of space. A still greater advantage is attained by mounting it on wheels and

Fig. 1.—Portable Apparatus for Farming Operations.

moving it about the wood yard from pile to pile. In this case the wood that is cut is placed directly into the delivery wagon or cart and one or two additional handlings avoided. When the machine is used as a portable outfit a flexible and sectionalized portable cable is supplied in 50-foot lengths. Saw guards can also be supplied when desired. Wood dealers who have used the Walter electric saw table praise it highly for its labor and power saving and for the great speed with which it can saw a large amount of wood.

Portable Apparatus for Farming.

As a consequence of the growing adoption of scientific methods in connection with agricultural effort, the next few years will undoubtedly witness a great headway in the use of electrical power in this direction.

Makers of electrical apparatus are not blind to the needs of the farmer and there must be much interesting installation work carried out as electrical power is made available either from big "overland" electric stations as in Germany, or from hydroelectric transmission lines as in this country. The "overland" movement in Germany where so much store is set by agriculture, has by means of long-distance transmission, brought electrical applications within reach of numerous out-of-the-way farms. In such districts these overland schemes provide for transformers to be connected to overhead high-tension conductors for this purpose, transformers being mounted in wagons for transportation from place to place, for driving machinery as required. Such a wagon, which has been developed by the Allgemeine Elektricitäts Gesellschaft, of Berlin, expressly for farming service, and so constructed as to comply with the safety rules of the Verband Deutscher Elektrotechniker, is shown in the illustrations herewith. Fig. 1 represents it with the bow current collector lowered, and Fig. 2 shows a field connection to the overhead high-tension line, ready for use. The wagon is mounted on springs and is constructed of iron, insuring proper earthing of all parts. It will be observed that convenient doors are arranged for giving easy access to the apparatus. As indicated, the bow collector can be lowered for transport. A lattice surrounds this collector and supports it as lowered, also holding it steady when raised. The field connection consists of three fixed insulators, and three movable ones which carry the connecting hooks for the connection of the movable conductors, which can only be hung in position when the current is switched off. High-tension leads, placed inside the protecting cover, conduct the current by leading-in tubes to the fuses, choking coils, oil switches, etc., and thence to the transformers. The wagons are built for 40 or 80 kilowatts and the work that they are doing includes the driving of plows, threshing machines, pumps for drainage and irrigation, etc. The low-tension equipment comprises a meter, the low-tension fuses, excess-voltage fuses, and a terminal box. The movable cable leading to the current-consuming apparatus is sometimes as long as 1,000 meters in the case of plows, and the transformer low-tension side is designed for from 220 to 380 volts for short distances, and for from 500 to 1,000 volts for longer distances.

It will readily be noted that such equipments have a wide scope in other fields of service besides agriculture.

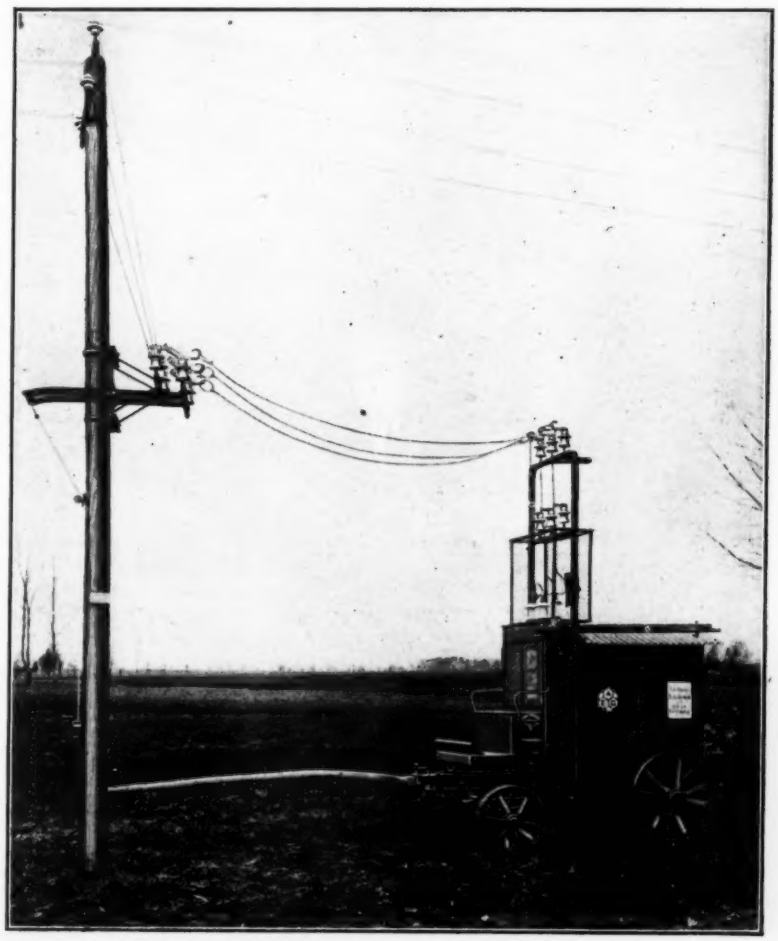


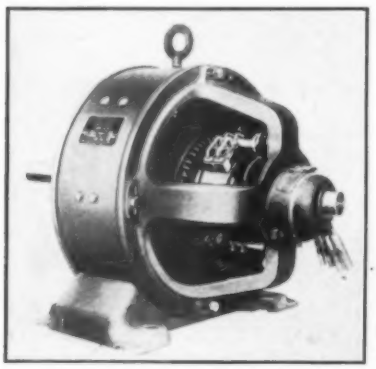
Fig. 2.—Apparatus Connected.

A New Elevator Motor.

A new line of direct-current, commutating-pole elevator motors has recently been put on the market by the Westinghouse Electric & Manufacturing Company. The principal reason for the development of this new line was the demand for a quietly operating direct-current motor requiring a minimum of attention. In order to obtain the latter characteristics, type SK elevator motors have commutating poles, extra large and cool-running bearings, and a very rugged and substantial construction throughout.

Excellent commutation is obtained, principally by the use of commutating poles. This feature results in sparkless commutation even under severe overloads, frequent starting and stopping, and rapid acceleration incident to elevator service. Good commutation results in long life of commutator, brushholders and brushes; while freedom from deposits of copper and carbon dust keeps the insulation of the windings in good condition.

The motors develop very high torque at starting, and the controller is arranged to cut out the starting resistance automatically at a rate which keeps the torque practically constant while accelerating. The elevator car is, therefore, quickly started and rapidly accelerated to full speed.



Elevator Motor.

Another advantageous point claimed for these motors is their quiet operation, a feature obtained by the peculiar design and distribution of its windings, and certain mechanical adjustments.

Quiet operation makes these motors very desirable for elevator installations in hotels, apartment houses, hospitals and office buildings, where a noisy motor would be objectionable.

The frame yoke is a slab of open-hearth steel, hot-rolled into its circular shape. It is riveted under pressure to a one-piece pressed-steel foot, the bottom of which is machined to dimensions for mounting. The armature has a laminated core with ventilating slots. The shaft is removable without disturbing the armature windings or commutator connections. The commutator end of the shaft extends 1.25 inches clear of the housing. This feature makes it possible to turn the armature on its shaft by means of a wrench.

For different kinds of elevator service, these motors are made in three classes. Class I comprises adjustable-speed motors, suitable for high-speed passenger-elevator service; Class II, for moderate-speed freight and passenger-elevator service; Class III motors for slow-speed freight elevators.

Mineral Waste.

During the last year, in producing half a billion tons of coal we wasted or left underground, in such condition that it probably will not be recovered in the future, a quarter of a billion tons of coal; we turned loose into the atmosphere a quantity of natural gas larger than the total output of artificial gas during the same period in all the towns and cities of the United States; we also wasted or lost in the mining, preparation and treatment of other important metalliferous and non-metalliferous minerals from 10 to 50 per cent of the year's production of such minerals.

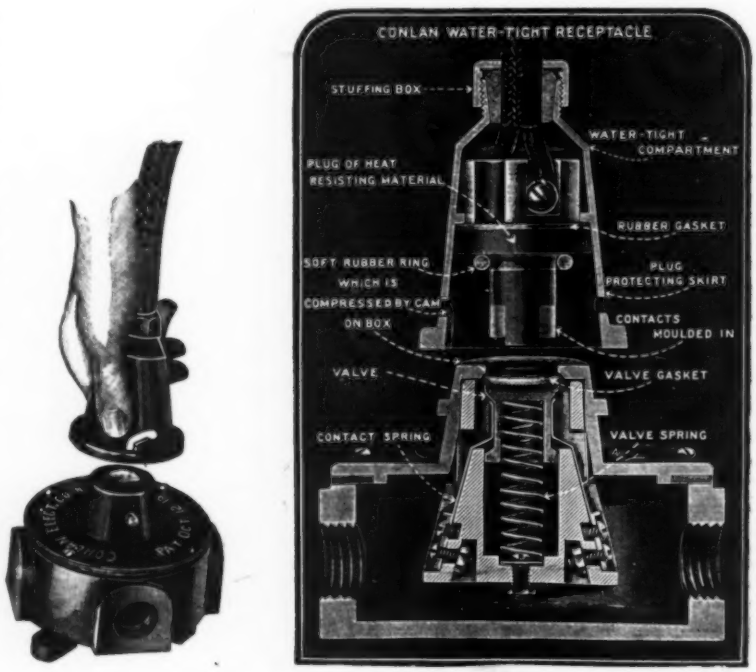
The above is the manner in which Joseph A. Holmes, director of the United States Bureau of Mines, describes some of the losses in the yearly production of two billion dollars' worth of minerals in the United States.

A bulletin just issued by the Bureau gives an inventory of the wastes.

The Conlan Watertight Receptacle.

The Conlan Electric Company, 43 Murray Street, New York, N. Y., has put on the market a new watertight receptacle and plug which meets the demand for a device of this kind in places where steam, dampness or corrosive vapors or fumes abound and are liable to damage interior conduit, wire and fittings. The device is entirely automatic, requires no separate switch and screw cap and is operable by an unskilled workman.

As shown in the illustrations, the receptacle is mounted on a special cover for any standard outlet box. The distinctive feature of the receptacle is a valve that is automatically closed by a helical spring on the withdrawal of the plug, thus keeping the box and conduit hermetically sealed, as clearly shown. In the plug, the cable or cord terminals are placed in a watertight compartment. A metal skirt extends about the open end of the plug to protect it. Around the inner portion of the plug is a soft rubber ring that forms a compression gasket against the projecting top of the box cover when the plug is inserted. The plug is securely locked in place by two cam slots and lugs, as shown. The spring of the valve is so strong that it causes a forcible ejection of the plug and therefore sudden separation of the contacts when the plug is slightly turned to release it. This dispenses with the need for an additional switch. All metal parts are of heavy brass or bronze. The receptacle is of porcelain. The plug and valve are made of a special heat-resisting insulating compound.



Conlan Watertight Receptacle.

Current Electrical News

LIGHTING AND POWER.

(Special Correspondence.)

BANGOUR, ME.—The City Council has voted to install many new lights in the city.

GILMORE CITY, IOWA.—An electric lighting franchise has been granted to H. W. Heath.

GREENFIELD, IOWA.—The city is considering changing its light plant to alternating system. C.

LINEVILLE, IOWA.—Bonds have been voted for the installation of electric lights at this place. C.

OAKVILLE, IOWA.—A. Weiland has secured a site for his electric light station and will install a plant. C.

BARBERTON, O.—This place is considering the establishment of a municipal electric lighting plant.

DONIPHAN, NEB.—This town has under consideration the installation of an electric light and water system.

BELFIELD, N. D.—Tony Lerfald, of Anoka, Minn., contemplates installing an electric light plant here. C.

MONTOUR, IA.—The voters have approved a franchise for electric lighting to Dows, Smith Reed Cook. C.

DELTA, IOWA.—Sigourney Transmission Company has been granted an electric light franchise in this town.

NIAGARA FALLS, N. Y.—This city has under consideration the establishment of a municipal lighting plant.

WATKINS, MINN.—A franchise for electric lights was granted to the Lethert Electric Company, of St. Paul.

ST. PAUL, MINN.—Mayor Keller is taking active steps to have a municipal lighting plant installed in this city.

HOLYOKE, MASS.—This town again has under consideration the question of a municipal electric light plant.

ALAMEDA, CAL.—The Superintendent of Electricity of this place has commenced work on plans for a new electric light and power plant.

COON RAPIDS, IOWA.—Editor Henry has been granted a 20-year franchise for electric lighting at this place.

PHILMONT, N. Y.—The tax payers of this place have voted in favor of a $5,000 bond issue for lighting purposes.

FONTANELLE, IOWA.—There is talk of installing an electric light plant here and securing power from Greenfield. C.

NEW LONDON, IOWA.—This town has voted $2,000 additional bonds for completing the municipal electric light plant. C.

NEENAH, WIS.—The Bergstrom Paper Company is preparing to start work on a large power plant here. Waterpower will be used in generating electricity.

WHITE CLOUD, KANS.—A bond issue of $5,000 has been voted here for the erection of a municipal electric lighting plant.

BINGHAMTON, N. Y.—The Binghamton Light, Heat & Power Company will place all of its wires underground by October 15.

MADISON, MINN.—J. G. Robertson of St. Paul, received the contract to build the municipal electric light plant at $20,593. C.

WILMORE, KY.—The electric light & ice plant at this place was destroyed by fire Aug. 31, with a loss of $10,000. It will be rebuilt.

OSSEO, WIS.—It is reported that J. N. Lee & Son will be the proprietors of an electric light plant, which is being talked of for this town.

WEST UNION, IOWA.—The Millers have been granted a power and light franchise and the transmission line will be extended here at once. C.

WARREN, MINN.—The City Council has under consideration issuing additional bonds for the purpose of enlarging the electric light plant.

BUTTE, MONT.—The City Council has passed an ordinance providing for a luminous-arc system of lighting for the business section of the city.

FALL RIVER, MASS.—The Aldermanic Committee on Street Lights has recommended that 75 additional lights be installed throughout the city.

COLUMBUS, WIS.—The Water and Light Commission proposes to enlarge the city lighting system, install a system of electroliers of 90 lamps, etc.

SALT LAKE CITY, UTAH.—The Merchants Light & Power Company has been awarded a franchise for the installation of a light and power system.

OGDEN, UTAH.—A 50-year franchise has been granted to the Merchants' Light & Power Company of this place to do business in Salt Lake City.

NEW HOLSTEIN, WIS.—The Acker Electrical Co., of Sheboygan, Wis., received the contract to install an electric light plant for this village; cost $15,000. C.

NORWALKS, O.—The local electric light plant is to be greatly improved and new machinery installed within a short time. Investigations are now being made. H.

FREDERICKSTOWN, MO.—A bond issue of $12,000 has been voted by the citizens of this place for the purpose of installing a municipal electric lighting plant.

WINTER GARDEN, FLA.—The Winter Garden Light & Water Company has been incorporated with a capital stock of $20,000. W. H. Reams is president of the company.

BROWNTON, MINN.—F. Booth, village clerk, will receive bids until September 20, for the construction of an electric lighting system, on plans by Earle D. Jackson, engineer, St. Paul.

HASTINGS, IOWA.—A franchise for electric lighting has been granted to the Central Engineering Company of Glenwood, Iowa. The current will be furnished from the plant at Glenwood.

NEW KNOXVILLE, O.—The New Knoxville Electric Company has been incorporated with a capital stock of $8,000 for the purpose of dealing in electricity for light, heat and power purposes.

SYRACUSE, N. Y.—Bids for the installation of an electric lighting plant at the Syracuse Institution for Feeble-Minded Children are being considered. The estimated cost of this institution is $8,000.

KAYSVILLE, UTAH.—A 25-year franchise has been granted to the Home Telephone & Electric Company for furnishing power and lights in Laytom, Clearfield, Hooper, Syracuse and surrounding country.

MONTGOMERY, MINN. — The Common Council of this city has granted permission to James P. Porteus and associates to establish, maintain and operate an electric light and power plant in Montgomery.

PENSACOLA, FLA.—The Lighting Committee of the Board of Public Works plans to add many improvements in the way of lighting in this city, among which another "White Way" will be installed.

SENECA, S. C.—The Conneross Light & Power Company has been incorporated with a capital stock of $100,000 by G. W. Gignilliat, L. A. Edwards and Campbell Courtney. The company will do a general light and power business.

AUGUSTA, ILL.—The Middle West Utility Company has purchased the properties of the Independent Light & Power Company, and also a plant at Plymouth, and the two will be supplied by a transmission line from Colchester. Z.

MEMPHIS, TENN.—Plans have been completed by the Edgar-Morgan Grain Company of this place for the erection of an electrically-operated grain elevator on the tracks of the Louisville & Nashville Railroad near Memphis. G.

MINOT, N. D.—The City Commissioners, the Commercial Club and the Consumers Power Company have under consideration a "White Way" for Minot and the Consumers Power Company is prepared to invest $7,000 or more, if the people want it.

KILBOURN, WIS.—The Southern Wisconsin Power Company is considering plans for an extensive enlargement of its plant at this place, including the installation of another dynamo which will give an additional capacity:

of 2,000 horsepower and extend the company's radius of operations by at least 50 miles.

BROOKSVILLE, FLA. — Brooksville Light & Power Company has been organized with a capital stock of $50,000 for the purpose of taking over the Brooksville ice, light and water plants. The new company will make improvements to the system.

CHICAGO, ILL.—Union Central Electric Company has been incorporated with a capital stock of $5,000 for the purpose of generating and dealing in electric current. The incorporators are William H. C. Weston, Guy E. Summers and Noble B. Judah, Jr.

ANTWERP, N. Y.—The Northern Power Company, of Potsdam, has been granted a franchise to construct lines in this village. It is expected that construction work will be started next spring and that power will be distributed in the village three months later.

BIRMINGHAM, ALA.—It is stated that the Alabama Interstate Power Company will invest $55,000,000 in the development of waterpower in Alabama. This company has already started work on six miles of new railroad in Chilton County to the new dam on the Coosa River, which it is building and which will develop 60,000 horsepower.

NEW ALBANY, IND.—The United Gas & Electric Company is planning extension of its service to a number of near-by towns in the southern section of this state, including an extension from the New Albany central station to Edwardsville, Georgetown, Galena, Sellersburg and other neighboring points which are becoming densely populated. G.

SALIDA, CAL.—The Sierra & San Francisco Power Company has announced its intention of extending its power line from Salida to the Curtis ranch, a distance of four miles. Two 10-horsepower motors will be installed there. The company has also stated that this is only the first of several extensions which will be made in the vicinity of Modesto in the near future.

LITTLE ROCK, ARK.—The Merchants' Lighting Company has filed articles of incorporation with a capital stock of $500,000. The incorporators are Ed. Cornish, Chris. Ledwidge, C. E. Rose, Ike Kempner and W. A. O'Leary. This company has been assigned the franchise recently granted the Arkansas Cold Storage Company to operate an electric lighting and power plant in this city.

PLACERVILLE, CAL.—The Western States Gas & Electric Company has made the announcement that it will extend its line to Camino and be prepared to furnish electricity for lighting and power purposes there by October 15. Announcement has also been made that as soon as this work is accomplished the company will turn its attention to Diamond Springs and El Dorado and determine the feasibility of putting in a line for a distribution system to these towns also.

COVINGTON, KY.—A Municipal Lighting Committee composed of members of the City Council has filed a preliminary report with Mayor George E. Phillips proposing the establishment of an electric light and power plant, municipally owned and operated. The committee has conferred with a number of electrical engineers as to the project and it is not improbable that an engineer will be selected in the near future to make definite plans for the work. G.

FREEPORT, ILL.—It is reported here that the Insull Company will keep a gang of men busy as long as the weather permits on erecting a pole line from Freeport to Dixon for the transmission of electric current from the power house here for lighting purposes in the town of Dixon and intervening places along the route. It is expected that this work will be followed by the building of an interurban by the same interests from Freeport to Stockton, running through Pearl City.

KINCAID, ILL.—A giant plant to be constructed here will, it is believed, supply current for the 25 or more public utilities plants which have been purchased by the Commonwealth Edison Company, and the Public Service Company, of which the Peabody interests of Chicago, comprise the leading spirit. The projected interurbans between Pana and Springfield, and between Decatur and Litchfield, will also get their power from the same source, the Central Illinois Traction Company being the promoter of these two lines.

BLOOMINGTON, ILL. — The Bloomington & Normal Railway & Light Company has increased its capital stock from $900,000 to $1,500,000. In addition to the present rights and powers the corporate objects include the construction and equipment, leasing, maintenance and operation of street railroads, plants and systems for the manufacture, generation, procuring and distribution of gas, electrical energy, steam and hot-water plants, not only in the cities of Bloomington and Normal, but throughout McLean and adjacent counties.

LOS ANGELES, CAL.—The Pacific Gas & Electric Company has plans for the construction of two additional waterpower plants, one on the Yuba River in Nevada County and the other on the Bear River in Placer County. These plants are to be constructed for the purpose of making use of the water already impounded in 20 reservoirs on the South Yuba River having a capacity of 2,024,000,000 cubic feet, and of the water stored in Lake Spaulding, where it is estimated there is available 4,000,000,000 cubic feet. From these two new hydroelectric plants it is expected to run high-tension transmission lines through Placer, Nevada, Yuba, Sutter, Yolo and Solano Counties to connect with the various electric systems of the company at its load center.

TELEPHONE AND TELEGRAPH.

(Special Correspondence.)

FOSSTON, MINN.—The Garden Valley Telephone Company has been granted admission to the city. C.

NEW PRAGUE, MINN.—The New Prague Telephone Company will build 25 miles of new lines and branches this fall. C.

TACOMA, WASH.—The Sunset Telephone & Telegraph Company will make improvements to the extent of $100,000 if granted a new franchise to operate in this city. C.

PHILADELPHIA, PA.—The Bell Telephone Company has awarded a contract to the McCall Company to build a branch exchange at the corner of Broad Street and Duncannon Avenue.

ROGERS, ARK.—The Southwestern Telegraph & Telephone Company intends to install a flashlight system and make other improvements, at an expenditure of $30,000.

FLAGSTAFF, ARIZ.—Congress is to be asked for an appropriation of $40,000 for the purpose of building a telephone line from this place to the Navajo Indian School at Tuba.

BLOOMDALE, O.—The farmers of this section have organized a mutual telephone company. Elias Miller has been elected president and T. A. Rosendale, secretary. They will put in a telephone exchange at Bloomdale.

WASHAUGAL, WASH.—Articles of incorporation have been filed for the Farmers' Co-Operative Telephone Association of this place. The new company will operate a mutual telephone exchange in which there will be no profit whatever.

OKLAHOMA CITY, OKLA.—The Pearl Valley Telephone Company has been incorporated with a capital stock of $1,000. The incorporators are John S. Chambers, Andrew F. Thompson, Henry Thompson, George L. Bristow, all of Cedardale.

FRANKFORT, KY.—The Prestonsburg & Hindman Telephone Company has filed amended articles of incorporation in this city authorizing an increase in capitalization from $4,500 to $12,000 and including the operation of a telegraph system in its business. G.

SALT LAKE CITY, UTAH.—W. H. Bywater, chief of the Fire Department, has recommended to Mayor S. C. Park that steps be taken to install a telephone system for fire alarm purposes, which will be absolutely independent of the local telephone system.

BOSWELL, PA. — The Boswell Council has passed a resolution giving the Bell Telephone Company a franchise in this place providing that it gives free service to part of Somerset County to its subscribers in Boswell and certain fixed charges for residence and business telephones.

BIRMINGHAM, ALA.—The Southern Bell Telephone & Telegraph Company has announced its intention to expend $25,000 on a cable line to Bessemer, which will allow 50 additional lines to the 18 already existing to that town. The company proposes to expedite this work as much as possible and a large force of men will be put to work at once.

AUSTIN, TEX.—An increase in its capital stock from $20,000,000 to $100,000,000 is planned by the Southwestern Telegraph & Telephone Company, and it is also proposed to change the name of this company to the Southwestern-Bell Telephone Company. It is expected that the company will make material improvements in its system in the state of Texas.

SEATTLE, WASH.—The Pacific Telephone & Telegraph Company has been notified by the Superintendent of Public Utilities that all the physical assets of the old Independent Telephone Company, which has been absorbed by the Pacific, must be removed from the streets and alleys of the city within a specified time, and unless this order is complied with the city will take possession of them and use them as the foundation for a municipal telegraph system.

ELECTRIC RAILWAYS.

(Special Correspondence.)

DAYTON, O.—The Dayton & Trol Electric Railway Company is planning to increase its capital stock and make many needed improvements to the system.

INDEPENDENCE, ORE.—It is stated that the Independence & Monmouth Railroad Company will build an electric line to Buena Vista, a distance of seven miles altogether.

SHREVEPORT, LA.—Allen Randall and W. F. Dillon, representing the local traction company, purchased the franchise for an electric car line from this city to Cedar Grove at a public sale recently held.

OWENSBORO, KY.—The Owensboro Business Men's Association is in charge of a proposition to build a street car line to the plant of the Universal Stenotype Company, and it is expected that work will soon be started.

KALAMAZOO, MICH.—It has been announced that the Michigan United Traction Company will construct a new three-rail high-speed interurban line between Grand Rapids and this place, which will be a 50-mile extension of the present system. It is expected that the road will be in operation within a year.

KANSAS CITY, MO.—Work is to be started at once on the construction of the double tracking of the St. Louis & Kansas City Electric Railway Company's line, which will connect these two cities and intermediate towns. It is expected that the entire cost of the new road with power plant will be $15,000.

CHATTANOOGA, TENN.—The Chattanoga Railway & Light Company has undertaken to build a surface railway to the top of Lookout Mountain. While no definite plans are at present known, the company has promised to have the road in operation by the time of the Confederate Veterans' reunion next spring.

JACKSONVILLE, FLA.—C. W. Morton and others have taken up the franchise which was granted to R. R. Robinson and others to build a traction line from Moncrief Springs to Highway Avenue, a distance of six miles, and work will soon be started on the construction of the road, so it is promised.

GILBERTVILLE, MASS.—It is reported that Ware capital will be interested in the building of the Gilbertville-Coldbrook line. If the line is built it will connect with the Ware & Brookfield line at this place and would pass through some of the most prosperous manufacturing villages in the New England States.

KEYSER, W. VA.—It is reported that Pittsburgh capitalists are contemplating building a street car line from Keyser to Petersburg, and later to extend it as far south as the Chesapeake & Ohio railroad in Virginia. It is proposed to erect the power plant on the south branch of the Potomac River, near Petersburg.

HARTFORD, CONN.—The Bristol & Plainville Tramway Company has received several petitions from the citizens of this place to extend its line from the present terminus on Woodland Street to Goodwin Street, thence to Queen, to East and Prospect Streets, continuing to Main Street, thus making a loop of the line.

SAN BENITO, TEX.—The San Benito & Rio Grande Valley Interurban Railway Company plans to issue $10,000,000 in bonds for the purpose of financing the building of lines which will cover the entire lower Rio Grande Valley in Texas. The cost of the new lines is estimated at $25,000 per mile and will total some 200 miles.

INDIANAPOLIS, IND.—The Indianapolis, Chicago & Meridian Railway has filed a mortgage to the West Jersey Trust Company, of Camden, N. J., for the purpose of financing the building of an electric railway 156 miles long, which will run from Indianapolis to East Chicago, by way of Sheridan, Monticello, Valparaiso, Gary and Hammond.

ST. AUGUSTINE, FLA.—If present plans go through an electric railway will be built from this place to Jacksonville. While few particulars are known about the project, it is believed that the project is being backed by some very substantial men and that the road will be a reality. Mr. Osmond and an engineer have inspected the proposed route, which extends along the coast to Palm Valley or Diego, and from there to Jacksonville.

PORTLAND, ORE.—The Washington Electric Railway Company which has been incorporated with a capital stock of $1,000,000, will build a new electric line from Tacoma to Vancouver, passing through Chehalis, Centralia and Olympia. Branch lines will be constructed through Tenino, Kopiah, Oakville, Toledo, Kelso, Raymond, South Bend, Aberdeen, Hoquiam and Randle. It is understood that the Welch interests, controlling the Washington-Oregon corporation, are the real backers of the road.

PEKIN, ILL.—Articles of incorporation have been filed for the Central & Western Illinois Traction Company, having a capital stock of $200,000. The purpose of the company is to build a line from Pekin and Peoria through the counties of Tazewell, Peoria, Fulton, McDonough and Hancock to Keokuk, Iowa. The line when built will carry passengers, freight, express and United States mail. The incorporators are J. T. Adams, Columbus, O.; C. P. Williams, Chicago, Ill.; A. L. Ralston, Grove City, O.; W. R. Curran, Pekin, Ill.; Lon M. Ash, Canton, Ill.; Calvin G. Formhals and Bert C. Huddleson, Smithfield, Ill.

SPRINGFIELD, ILL.—It has been announced from an authoritative source that the Springfield & Central Illinois Traction Company has arranged for the financing of the interurban railway which they intend to build to Decatur, Sullivan and Mattoon. This line was projected some seven years ago, and after about $16,000 was spent by the promoters the Springfield & Central Illinois Company was organized and took over the assets of the former company. George Spitler, of Mount Zion; T. T. Springer, of Decatur; J. M. Clokey, of Decatur, and J. A. McFall, of Mattoon, are four of the original directorate, who still are with the company.

PROPOSALS.

ELECTRICAL EQUIPMENT.—Sealed proposals will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, D. C., until October 8 for one motor-driven radial drill and two motor-driven toolroom lathes to be delivered at the Navy Yard, Brooklyn, N. Y., as per Schedule 4833.

SWITCHBOARDS AND GENERATING SETS.—Sealed proposals, in triplicate, will be received at the Depot Quartermaster's office, Washington, D. C., until October 3 for furnishing generating sets and switchboards for the laundry plant at Schofield Barracks, H. I. Blank forms for proposals will be furnished upon application.

ELECTRIC CONDUIT AND WIRING AND INTERIOR LIGHTING FIXTURES.—Sealed proposals will be received at the office of the Supervising Architect, Washington, D. C., until October 17, for the electric conduit and wiring and interior lighting fixtures for a two-story building for the post office at Lansing, Mich.; until October 18 for the post office at Waukegan, Ill. Drawings and specifications may be obtained from the office of the Supervising Architect.

ELECTRIC CONDUITS AND WIRING AND INTERIOR LIGHTING FIXTURES.—Sealed proposals will be received at the office of the Supervising Architect, Washington, D. C., until October 7 for electric conduits and wiring and interior lighting fixtures for a one-story building for the post office at Butler, Pa.; until October 24 for a one-story building for the post office at Brownwood, Tex. Drawings and specifications may be had from the office of the Supervising Architect.

FOREIGN TRADE OPPORTUNITIES.

(*Parties interested in the following items should address the Bureau of Manufactures, Washintgon, D. C., and refer to the file number noted.*)

NO. 9481. ELECTRICAL MACHINERY AND SUPPLIES.—A report from an American consul in the Far East states that an electric-light company in his district has increased its capital stock from $100,000 to $500,000 for the purpose of enlarging its plant and installing the most modern equipment. Catalogues for machinery, supplies, etc., should be forwarded to the firm named in the report.

No. 9488. ELECTRICAL MACHINERY, SUPPLIES, ETC.—An American consul in the Far East reports that two electric railway companies have been granted charters for narrow-gauge railways. These railways are in the market for machinery and supplies.

No. 9494. ELECTRICAL MACHINERY.—An American consul in Japan reports that a charter has been granted a company to furnish electric light and power in a certain municipality. Catalogues of machinery, supplies, etc., should be sent to the president of the company, whose name is given in the report.

No. 9496. ELECTRIC LIGHT AND POWER PLANT.—An American consul in South Africa reports that American manufacturers of electrical machinery might profit by sending their catalogues, etc., to an address furnished by him. It is expected that a municipality will purchase a plant at present owned by a private company, and should this occur considerable overhauling will be needed and other improvements undertaken.

FINANCIAL NOTES.

As was shown in the ELECTRICAL REVIEW AND WESTERN ELECTRICIAN last week in a discussion of the outlook for business in the electrical industry, everything points to a season of considerable activity and material prosperity. Reports from every section of the country indicate that jobbing interests are becoming more active. The results of the national advertising of the current-consuming devices are becoming more and more apparent and the larger manufacturers of electrical material are experiencing a greatly improved demand for apparatus of every description.

Underlying conditions appear to be especially promising. The Government crop report of September 1 indicates that for practically every character of agricultural produce the favorable weather of the last four weeks will make for a considerably augmented harvest. The quickened impulse of a better condition is extending to sections which have hitherto been backward, and it appears now as if nothing could prevent the upward climb and the onward march.

The United Telegraph & Telephone Company, of Philadelphia, recently followed the path of its parent company when it was declared a bankrupt by Judge C. V. Henry, of Lebanon, specially presiding in Common Pleas Court, and S. R. Caldwell, of West Chester, was appointed temporary receiver. The United Company is a subsidiary of the American Union Telephone Company, which is in the hands of receivers appointed by the United States Court. At the same time a motion was made to require the receivers of the American Union Telephone & Telegraph Company to turn over to Theodore A. Lamb, of Erie, property of the Union Telephone Company, of Erie, Pa. Mr. Lamb is receiver of the Union Company, which is leased to the American Union.

In point of gross business National Carbon seems likely this year to exceed all previous records. Gross sales are running at a rate which for a full 12 months would mean between $400,000 and $500,000 more orders billed than last year. Of this gain in gross about 50 per cent is being saved for net. This would leave a balance of net for dividends of close to $1,200,000 compared with $1,303,296 in the high record year 1910. The balance for the $5,500,000 common should equal at least 15 per cent. There is a fair chance that the present 6 per cent rate on the common will be increased to 7 per cent some time after the opening of the 1913 year, but this matter is entirely undecided.

General Electric Company is so far sold ahead and is so pressed for deliveries in certain departments that some general price advances in the very near future are extremely probable. All through 1911 it was a case of minor price-cutting here and there among the electrical companies in their efforts to corral business. For the last three or four months orders have been piling up at such a rate that an advance in prices would not only be warranted by trade conditions and higher cost of steel and copper, but it would be a move in self-defense enabling the company to catch up with orders already booked.

As the second largest individual consumer of copper in the country, the advance in the metal from 12 to nearly 18 cents per pound represents a subtraction from net earnings equal to 3 per cent on the capital stock. It is evident that some general advance in prices is logical under the conditions.

August business of the Westinghouse Electric & Manufacturing Company maintained the high record of the rest of the current fiscal year, and the company is now doing the best business of its history. While earnings will, undoubtedly, be higher this year than for any other similar period, the dividend to be declared at the end of this month is problematical.

The wire manufacturing plants of the Dollar Bay Land & Improvement Company and Tamarack & Osceola Manufacturing Company and 3,000 acres of land in the vicinity of Dollar Bay, have been purchased by John A. Roebling Sons & Company from Bigelow-Hyams interests.

The General Electric Company has filed with the Secretary of State at Albany, N. Y., a notice of an increase of capital stock from $80,000,000 to $105,000,000. The certificate is signed by C. A. Coffin, president; M. F. Westover, secretary, and others.

A stockholder's meeting of the Ephrata & Lebanon Electric Railway Company, of Pennsylvania, has authorized an issue of $250,000 additional six-per-cent bonds to provide money for the completion of the line as originally projected. On that portion of the line already in operation, storage battery cars are being successfully used. As soon as the new bonds are sold work will be commenced upon that branch of the line running from Lebanon to Kleinfeltersville, a distance of fourteen miles.

The earnings of the Pacific Telephone & Telegraph Company continue to increase with each monthly statement. The July gross was $414,964, as compared with $316,946 in the same month last year. For the seven months ending July 31 the comparison is: 1911, $1,646,136; 1912, $2,102,846. Reports of the business of the company state that the number of new connections being made at present is greater than at any period of the company's history.

Shareholders of the Shawinigan Water & Power Company, of Montreal, met on Tuesday and unanimously voted to authorize a new stock issue of $5,000,000 The new stock is to be issued at such time as the directors may determine. Immediately after the stockholders' meeting the directors passed a resolution to issue at once $1,000,000 of the new stock to the present shareholders at $120. This offer will be made to stockholders of record September 30, and the first installment of 50 per cent will be payable on October 21, and the second, of the same amount, November 20. The business of the company has been growing very rapidly during the past two years, and additions to its hydroelectric plants are absolutely necessary. During the past year a new hydroelectric plant, capable of 75,000 horsepower, was installed. At present this station has been equipped up to a capacity of 85,000 horsepower. It is to pay for these additions and to provide for future installations that the new funds are required. The authorized capital of the company is $20,000,000, of which $10,000,000 has been already issued.

Dividends.

California Electric Generating Company; a quarterly preferred dividend of 1.5 per cent, payable October 1 to stock of record September 20.

Canadian General Electric Company; a quarterly common dividend of 1.75 per cent, and a semiannual preferred dividend of 3.5 per cent, both payable October 1 to stock of record September 14.

Duluth-Superior Traction Company; a quarterly preferred dividend of one per cent, and a quarterly common dividend of 1.25 per cent, both payable October 1 to stock of record September 20.

Harwood Electric Company of Philadelphia; an initial semiannual dividend of three per cent on the six-per-cent preferred stock, payable on demand.

Interborough Rapid Transit Company; a quarterly dividend of 2.5 per cent, payable October 1 to stock of record September 12.

Manhattan Railway Company; a quarterly dividend of 1.75 per cent, payable October 1 to stock of record September 16.

Manila Electric Railroad & Lighting Corporation; the regular quarterly dividend of 1.5 per cent, payable October 1 to stock of record September 18.

Shawinigan Water & Power Company; a quarterly dividend of 1.25 per cent, payable October 19 to stock of record October 7.

St. Joseph Railway, Light, Heat & Power Company; a quarterly common dividend of 1.5 per cent, and a quarterly preferred dividend of 1.75 per cent, both payable October 1 to stock of record September 16.

Twin City Rapid Transit Company; the regular quarterly dividends of 1.75 per cent on the preferred stock and 1.5 per cent on the common stock, both payable October 1 to stock of record September 16.

CLOSING BID PRICES FOR ELECTRICAL SECURITIES ON THE LEADING EXCHANGES AS COMPARED WITH THE PREVIOUS WEEK.

	Sept. 9.	Sept. 2.
American Tel. & Tel. (New York)	144¼	145¼
Commonwealth Edison (Chicago)	139	139
Edison Electric Illuminating (Boston)	290	.....
Electric Company of America (Philadelphia)	*12¼	*12¼
Electric Storage Battery common (Philadelphia)	58	56⅞
Electric Storage Battery preferred (Philadelphia)	58	56
General Electric (New York)	182	182
Kings County Electric (New York)	129	129
Manhattan Transit (New York)	2⅛	2⅛
Massachusetts Electric common (Boston)	18⅝	18¾
Massachusetts Electric preferred (Boston)	*94	*94
National Carbon common (Chicago)	118	118
National Carbon preferred (Chicago)	117½	117½
New England Telephone (Boston)	155	155
Philadelphia Electric (Philadelphia)	24½	23⅝
Postal Telegraph and Cables common (New York)	87	87
Postal Telegraph and Cables preferred (New York)	69⅞	69⅞
Western Union (New York)	81½	81½
Westinghouse common (New York)	87¾	87½
Westinghouse preferred (New York)	123⅛	123⅛

*Last price quoted.

Reports of Earnings.

DETROIT UNITED.

The Detroit United Railway Company reports as follows for July and seven months ended July 31:

	1912	1911.
July gross	$1,107,819	$ 959,588
July net	374,207	343,304
Other income	17,237	14,490
Total income	391,444	357,794
Surplus after charge...	215,142	180,417
Seven months gross....	6,498,388	5,727,637
Seven months net.....	2,269,776	2,085,063
Other income	117,610	99,941
Total income	2,387,386	2,185,004
Surplus after charges..	1,145,059	950,350

LAKE SHORE ELECTRIC.

The Lake Shore Electric Railway Company reports as follows for July and seven months ended July 31:

	1912	1911
July gross	$137,639	$135,290
Net after taxes	68,735	73,316
Surplus after charges....	33,548	38,545
Seven months gross.....	724,890	693,885
Net after taxes.....	297,455	318,773
Surplus after charges....	53,393	75,998

STONE & WEBSTER GAS AND ELECTRIC COMPANY'S JULY EARNINGS.

The following gas and electric companies under the management of Stone & Webster report earnings for July and twelve months ended July 31 as follows:

BLACKSTONE VALLEY GAS & ELECTRIC.		
July gross	$ 95,398	$ 83,738
July net	25,729	21,304
Surplus after charges..	16,780	12,682
Twelve months gross..	1,174,349	1,096,561
Twelve months net....	350,212	299,364
Surplus after charges..	244,346	197,617
DALLAS ELECTRIC CORPORATION.		
July gross	$ 144,534	$ 125,037
July net	55,695	37,201
Surplus after charges..	31,028	17,434
Twelve months gross..	1,728,517	1,559,557
Twelve months net....	622,096	518,998
Surplus after charges..	357,344	269,384
EL PASO ELECTRIC.		
July gross	$ 59,620	$ 51,834
July net	23,292	19,472
Surplus after charges..	17,416	12,739
Twelve months gross..	737,955	667,937
Twelve months net....	325,600	262,368
Surplus after charges..	244,332	182,154
GALVESTON-HOUSTON ELECTRIC.		
July gross	$ 180,558	$ 136,113
July net	80,002	53,857
Surplus after charges..	46,501	34,939
Twelve months gross..	1,778,397	1,430,165
Twelve months net....	700,474	530,050
Surplus after charges..	367,791	289,196
NORTHERN TEXAS ELECTRIC.		
July gross	$ 146,289	$ 131,383
July net	69,363	60,082
Surplus after charges..	48,505	38,913
Twelve months gross..	1,658,121	1,545,631
Twelve months net....	758,466	696,019
Surplus after charges..	507,012	464,769
TAMPA ELECTRIC.		
July gross	$ 63,181	$ 57,253
July net	30,841	26,303
Surplus after charges..	26,477	20,873
Twelve months gross..	732,567	621,111
Twelve months net....	342,734	274,741
Surplus after charges..	288,194	216,696
SAVANNAH ELECTRIC.		
July gross	$ 61,406	$ 64,038
July net	16,513	15,510
Surplus after charges..	200	199
Twelve months gross..	726,793	666,946
Twelve months net....	190,066	184,373
Surplus after charges..	1,036	1,378
SIERRA PACIFIC ELECTRIC.		
July gross	$ 53,241	$ 46,725
July net	33,621	29,012
Surplus after charges..	28,235	26,357
Twelve months gross..	608,226	562,498
Twelve months net....	365,179	357,562
Surplus after charges..	315,481	310,318

INTERBOROUGH RAPID TRANSIT.

The Interborough Rapid Transit Company has published its full pamphlet report for the year ended June 30. The operating expenses in detail of the Interborough company for the year ended June 30, 1912, compare with those of the previous fiscal year as follows:

	1912	1911
Maintenance of way and structures	$1,685,653	$1,581,750
Maintenance of equipment	2,773,395	2,562,800
Traffic	587	1,746
Transportation	7,342,703	7,110,510
General	1,245,463	1,112,175
Total operating expense.	13,047,802	12,368,982

KEYSTONE TELEPHONE.

The report of the Keystone Telephone Company for the month of July shows net earnings of $49,390, against $47,044 for July, 1911. The earnings statement for July and for the seven months of 1912:

	July 31, 1912	Year previous
For month ended—		
Gross earnings	$101,460	$ 96,106
Oper. expenses and taxes.	52,070	49,062
Net earnings	$ 49,390	$ 47,044
Less interest charges.....	25,323	24,392
Net surplus	$ 24,067	$ 22,652
For seven months—		
Gross earnings	$698,651	$677,415
Oper. expenses and taxes.	350,766	335,984
Net earnings	$347,885	$341,431
Less interest charges.....	175,565	170,706
Net surplus	$172,320	$170,725

PERSONAL MENTION.

F. A. BURKHARDT, district passenger and freight agent of the Ohio Electric Company at Lima, O., will look after the Toledo district temporarily.

FRANK O'NEILL, of Los Angeles, Cal., has been appointed to the position of electrical engineer for the Bureau of Fire Alarm and Police Telegraph in that city.

A. E. KENNELLY, professor of electrical engineering in Harvard University, has been attending the meeting of the British Association for the Advancement of Science at Dundee.

A. G. H. JENSSEN has resigned as district passenger agent of the Ohio Electric Railway Company, Toledo, O., to take charge of the Ohio territory for a local concern of a different nature.

R. B. MATEER, formerly power engineer with the Denver Gas & Electric Light Company, is now connected with the electric service department of the Great Western Power Company, San Francisco, Cal.

C. W. LATTIN, solicitor for the Home Telephone Company, Toledo, O., was married to Miss Tina Rodemaker, of Decatur, Ill., on Wednesday, September 4. Mr. and Mrs. Lattin will take a trip through the west.

JOHN RICE, general manager of the Western Electric Company, had his left arm and shoulder fractured and was internally injured when his automobile ran into a wash-out culvert between Dayton and Springfield, O., recently. Mrs. Rice was slightly bruised. Mr. Rice's injuries are considered of a serious nature.

HUGH T. WREAKS, of the Underwriters' Laboratory, New York City, made an address before the Washington Section of the American Institute of Electrical Engineers on September 6 on the subject, "Service Value of Electric Materials." The address was illustrated with lantern slides.

ROBERT F. PACK, formerly general manager of the Toronto Electric Company, Toronto, Can., has been appointed general manager of the Minneapolis General Electric Company. He assumed office Tuesday September 10. Since the resignation of A. W. Leonard early in August, the position has been temporarily filled by Samuel Kahn, who will resume his duties in the operating department of H. M. Byllesby & Company. George H. Harries, vice-president of the Consumers Power Company, will continue to act in a supervisory capacity over all the properties of this corporation, Mr. Pack being in direct charge of the Minneapolis property.

OBITUARY.

EDWARD BURKE, for many years manager of the Municipal Electrical Bureau of Philadelphia, died on September 2 in that city, following an operation for stomach trouble.

ALBERT L. FLACK, formerly president of the Home Telephone Company of this city, died of apoplexy recently at the age of 63. Mr. Flack leaves a wife and three sons.

DANIEL SEYMOUR BRISMADE, president and treasurer of the Housatonic Power Company, which controls much of the water power of the Housatonic River, died Saturday from stomach trouble, at the age of 57. He was connected with a number of large corporations.

NEW INCORPORATIONS.

NEW CASTLE, PA.—The Telegraph Cushion Key Company has been incorporated with a capital stock of $5,000.

PITTSBURGH, PA.—The Commonwealth Electric & Supply Company has been incorporated with a capital of $300,000. N.

WILMINGTON, DEL.—The governor of Delaware recently granted a charter of incorporation to the Chicago Suburban Gas & Electric Company of Chicago, Ill. The capital stock is $6,000,000. N.

FRANKFORT, CONN.—Walcut & Company has been incorporated with a capital stock of $20,000 to engage in the electrical business. The incorporators are John Walcut, J. J. King and Dallas Brightwell.

NEW YORK, N. Y.—The Modern Electric Machine Company has been incorporated with a capital stock of $2,000. The incorporators are Arnold Tyroler, Samuel Miller and Isaac Smith, all of New York City.

HOUSTON, TEX.—The Kitchel Plumbing & Electric Company has been incorporated with a capital stock of $10,000. The incorporators are Joseph B. Bowies, Charles M. Kitchel and Jesse Andrews, all of Houston.

CHICAGO, ILL.—The Colonial Electrical Construction Company has been incorporated with capital stock of $2,500, to do general construction work. The incorporators are Bird Malvin Graybill, Samuel J. Shaeffer and Morris Kempel. Z.

NEW YORK, N. Y.—Santo Electric Appliance Company has been incorporated with a capital stock of $15,000. The incorporators are Charles Groshut and Florence Groshut, New York City, and Herbert A. Durbrow, of Richmond, N. Y.

SEATTLE, WASH.—Joseph E. Wickstrom Company has been incorporated with a capital stock of $100,000 for the purpose of operating an electric light and water works plant. The incorporators are, W. J. Wickstrom, Charles L. Shotts and others.

BROOKLYN, N. Y.—Harrison Electric Company has been incorporated with a capital stock of $10,000 for the purpose of manufacturing electrical tools. The incorporators are Edward F. Quirke, John S. Quirke and R. M. Quirke, all of Brooklyn, N. Y.

MEMPHIS, TENN.—The United States Feed & Grain Company has been incorporated with $25,000 capital stock to build an electrically-operated grain elevator of considerable capacity. S. E. Rison is president of the new company and G. S. Knapp is superintendent. G.

NEW YORK, N. Y.—The firm of William G. Murrell & Brother, Incorporated, has been incorporated with a capital stock of $5,000 for the purpose of dealing in gas and electrical fixtures and supplies. The incorporators are William G. Murrell, George Murrell and Mary Roper, all of New York City.

SPRINGFIELD, O.—The United Telegraph & Cable Company has been incorporated with a capital stock of $3,000 for the purpose of manufacturing and dealing in electrical instruments, electrical supplies, etc., for building and equipping telegraph and cable lines, and to do a general manufacturing, jobbing and constructing business relating to telegraph and cable lines, equipment and operations. The incorporators are William M. Bruce, Jr., Charles I. Welsh, Oliver H. Clark, Paul A. Staley and Oliver H. Miller.

NEW PUBLICATIONS.

BOSTON WIRE DEPARTMENT.—The annual report of the Wire Department of the city of Boston for 1911 has come to hand. It gives the details of the construction work, both underground and overhead, which has been done in Boston during the year, with comparative figures for previous years. Electrical accidents are classified and it is shown that there were a total of 65 fires and 15 casualties, in which two persons were killed and 13 injured, 11 of the injured persons being employees of electrical companies. 1768 inspections of interior wiring were made, including examinations of 7,000 arc lamps, nearly 8,000 motors and 1,355,000 incandescent lamps. Detailed reports of the accidents are given.

With the Electrical Manufacturers

Meirowsky Brothers, importers and manufacturers of East India mica, have removed their New York City offices to 146 Liberty Street.

New England Engineering Company announces that E. C. Wigham has assumed the management of its Branford office, at 222 Main Street, Branford, Conn.

Eastern Electric Lamp Company, 141 Milk Street, Boston, Mass., is sending out with September calendar cards several circulars giving its price schedules for Eastern Mazda, tantalum and Gem lamps.

The Cincinnati Electric Equipment Company, Cincinnati, O., has installed electric bleaching equipment in the big establishment of the New York, Falls City & Ideal Laundries at Sixth and Jefferson Streets in Louisville, Ky.

The Emerson Electric Manufacturing Company, St. Louis, Mo., makes some very pertinent remarks in its September issue of *The Emerson Monthly* about very effective winter uses for electric fans. It also describes particularly the use of the furnace blower, schoolroom fans, exhausters, etc.

W. N. Matthews & Brother, St. Louis, Mo., are sending out circular letters and folders calling attention to the value of Matthews fuse switches for protecting the primaries of distributing circuits and sectionalizing any possible source of trouble. The firm makes an attractive trial offer to electrical companies.

Cutler-Hammer Clutch Company, Milwaukee, Wis., has issued Bulletin No. 1300, which describes and illustrates the company's magnetic separators. These are used in cement mills, paper-pulp mills, terra-cotta plants, or wherever it is desired to remove continuously magnetic material from non-magnetic bulk materials.

H. T. Paiste Company, Philadelphia, Pa., devotes *Paistery* No. 84 to pipe taplets and covers for same and to the new Fielding receptacles. The latter are wired without cutting the feed wires, which enables them to be used on wooden molding as well as pipe taplets. Illustrations of the new receptacles are given, with price list.

Westinghouse Church Kerr & Company, New York, N. Y., are acting as engineers and constructors for a bleach house for the Wilkes Barre Lace Manufacturing Company; for 50 modern houses of the bungalow type in Calgary, Alta.; for overhauling the hydroelectric plant of the Shenandoah River Light & Power Corporation, at Luray, Va.; and for rehabilitating the stoker equipment at the Chicago plant of N. K. Fairbanks & Company.

C. W. Hunt Company, New York City, has published catalog No. 12-4 on Hunt automatic railways for handling ore, coal, sand, clay, sand, limestone and similar bulk materials. The cars run with great rapidity by gravity for runs of 300 feet, dumping and returning in about 50 seconds. The energy for the return is obtained from the loaded down-grade run, the entire action being automatic and requiring only one man to see to the loading. The catalog shows many installations of these railways.

Allgemeine Elektricitäts Gesellschaft, Berlin, Germany, has recently issued two bulletins of particular interest to the users of electric power in the mining and smelting industries. A 76-page bulletin describes many types of polyphase slow-speed motors for driving large pumps, compressors and mine ventilators. A large number of installations are listed and several illustrated. A 36-page bulletin describes generators direct driven by gas engines for furnishing electric power in mines and smelters.

Copeman Electric Stove Company, Flint, Mich., has issued a booklet under the title "The Silent Servant," that will appeal strongly to up-to-date housewives. It describes four types of the Copeman automatic electric cook stove, each of which has one or more automatic time switches that close the cooking circuit at a predetermined time, and adjustable thermostatic switches that automatically open the circuit when a desired temperature is reached. The cooking is then finished on the fireless-cooker principle. The stoves can cook an entire meal of several dishes while the mistress is away.

American Carbon & Battery Company, 509 Olive Street, St. Louis, Mo., announces that it has completed the rebuilding and re-equipment of its carbon department, which was completely destroyed by fire on December 27, 1911. The latest improved machinery has been installed for grinding, mixing and pressing carbon in all grades to meet scientific requirements. The company manufactures wet and dry batteries, flash-light batteries, carbon electrodes, carbon and graphite brushes and specialties, lubricating graphite, etc. The new plant is now in full operation and ready to fill orders promptly.

General Electric Company, through its Edison Lamp Sales Department, Harrison, N. J., has begun a vigorous advertising and publicity campaign with the keynote "Electric Light for Everybody." Its first evidence is a striking advertisement that appears in over 6,000,000 copies of popular magazines having a nation-wide circulation. To insure the returns from this national advertising, the company is cooperating with central-station companies by furnishing them much valuable publicity material for local advertising campaigns. This includes blotters, street-car cards, posters, pasters for letter heads, bills, etc., lantern slides, newspaper cuts, and special booklets. Much of this material can be imprinted with the name of the local company. It is believed that by such concerted national and local efforts very great extensions of electric lighting will result.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued a number of new publications.—Leaflet 2359-A illustrates and describes type SK direct-current, commutating-pole motors. Views are shown of the inclosed, back-geared, and vertical types as well as the standard motors and various detail parts thereof.—Leaflet 3506, in a series of Westinghouse paper-mill motors, cov-

ers motors for pulp-mill service. Illustrations are shown of motors in operation and interesting data are given as to the use of electric motors in this industry.—Leaflet 2444 relates to the equalizer flywheel hoisting sets used in conjunction with electric hoists. Application views together with a diagram of connections showing the liquid rheostat are also given. The leaflet also describes the system in which these devices are used.—Leaflet 2457 covers commutating-pole rotary converters. These devices are described and illustrated in detail and considerable interesting information is given about their construction.—The No. 10 issue of "Small Motors," published by the Industrial and Power Department of the company, is devoted to several interesting stories of experiences enjoyed by various people with motors in the home. These stories are illustrated and furnish interesting advertisements for central-station new business departments.

DATES AHEAD.

Illuminating Engineering Society. Annual convention. Hotel Clifton, Niagara Falls, Ont., September 16-19.

Association of Iron and Steel Electrical Engineers. Annual convention, Hotel Pfister, Milwaukee, Wis., September 23-28.

The 1912 Boston Electric Show, Mechanics' Building, Boston, Mass., September 28 to October 26.

American Electric Railway Association and its five affiliated associations. Annual convention, Chicago, Ill., October 7-11.

Electric Vehicle Association. Annual convention, Boston, Mass., October 8.

Railway Signal Association. Annual meeting, Quebec, Can., October 8-11.

The New York Electrical Exposition and Automobile Show. The New Grand Central Palace, New York City, October 9-19.

Sons of Jove. Annual convention, Pittsburgh, Pa., October 14-16.

New England Section of the National Electric Light Association. **Fall** meeting, Boston, Mass., October 15-17.

Kansas Gas, Water, Electric Light and Street Railway Association. Annual meeting, Manhattan, Kas., October 17-19.

Association of Railway Electrical Engineers. Annual convention, Chicago, Ill., October 21-24.

Old Time Telegraphers' and Historical Association and the Society of the United States Military Telegraph Corps. Annual convention, Jacksonville, Fla., October 22-24.

Indiana Electric Light Association. Annual convention, Indianapolis, Ind., October 23 and 24.

Association of Telephone Pioneers of America. Annual convention, New York City, November 14-15.

Ohio Society of Mechanical, Electrical and Steam Engineers. Annual meeting, Akron, O., November 21-22.

American Mining Congress. Fifteenth annual meeting, Spokane, Wash., November 25-28.

Record of Electrical Patents.

Issued by the United States Patent Office, September 3, 1912.

1,037,197. Insulated Rail Joint. J. A. Bodkin, New York, N. Y. The bolt for joining the fish plates is insulated by a split bushing.

1,037,200. Holding-Sleeve for Conduits. M. Brinckerhoff, assignor to Ellcon Co., New York, N. Y. An externally threaded sleeve surrounds the conduit and is held to the junction box by two nuts.

1,037,217. Lubricating Device. F. Diehl, Elizabeth, N. J., assignor to Diehl Manufacturing Co. Provides oil circulation in the bearing of a vertical-shaft motor.

1,037,268. Process of Manufacturing Incandescence Bodies. H. Kuzel, assignor to General Electric Co. Metallic filaments are made by pressing a plastic mixture of a refractory and a metallic colloidal compound into filament shape and sintering at white heat in a reducing gas.

1,037,277. Hanger-Support. A. Martin, Moosic, Pa. For holding a trolley-wire ear.

1,037,290. Vacuum-Tube Lighting. D. McF. Moore, assignor to General Electric Co. Moore tubes are connected in parallel between protection boxes connected by conduit to a transformer.

1,037,294. Illuminated Sign. H. Mulholland, Cincinnati, O. Contains a wheel carrying incandescent lamps.

1,037,304. Socket Switch. W. G. Peet, assignor of one-half to Kilpatrick & Hotz Co., Bridgeport, Conn. Includes an oscillating blade adapted to be thrown into engagement with a contact or a retainer.

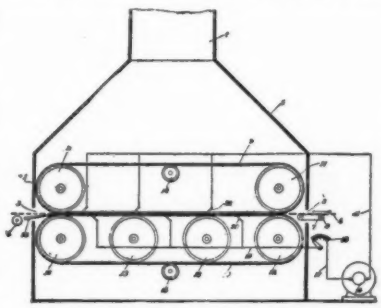
1,037,307. Spark Plug. A. S. Pierrel, Washington, La. The central electrode can be turned so as to form or prevent the formation of a spark gap.

1,037,327. Lapping Machine. B. M. Rogers, Albemarle, N. C. A relief circuit is closed when a certain pressure is exceeded.

1,037,330. Signaling System. H. O. Rugh, assignor to Sandwich Electric Co., Sandwich, Ill. Each station has a relay-controlled step-by-step selector.

1,037,344. Controlling Device for Electric Motors. J. J. Sinclair, Upper Montclair, N. J. A locking device for the controller has an electromagnetically controlled locking dog and ratchet wheel.

1,037,349. Electric Piano. I. B. Smith, assignor to Electrelle Co., Philadelphia, Pa. Has electromagnets for operating the hammers for the strings.



1,037,370.—Electric Drying and Bleaching.

1,037,369. Electrically Heated Steam-Radiator. J. S. Thompson, Mill Valley, Cal. Includes a diaphragm-operated ball valve regulating the amount of water that submerges the carbon electrodes.

1,037,370. Process of Drying and Bleaching. J. D. Tompkins, Valatie, N. Y. An electric current is passed through a traveling wet web of paper, thereby liberating oxygen.

1,037,379. Vacuum Apparatus. E. Weintraub, assignor to General Electric Co. A mercury-vapor quartz tube has a closure sealed by mercury.

1,037,397. Inclosed Fuse. G. Wright, assignor to General Electric Co. The fusible element consists of a number of parallel trough-shaped strips.

1,037,401. Timer for Explosion Engines. A. E. Youngren, Kewanee, Ill. Has means for retarding or advancing the spark and for completely reversing the engine.

1,037,421. Protecting Device for Electric Railway Plows. W. L. Boyer, Kingston, N. Y. Has a detachable wear-resisting member that bears against the slot rails of the conduit.

1,037,433. Motor-Control System. E. R. Carichoff, assignor to General Electric Co. A series-parallel controller for railway motors, includes contactors automatically actuated in proper sequence by relays when the master controller is in second position.

1,037,435. Motor-Control System. F. E. Case, assignor to General Electric Co. A series-parallel controller for a storage-battery locomotive or truck.

1,037,438. Telephone-Exchange System. E. E. Clement, Washington, D. C. Provides testing facilities for an automanual system.

1,037,447. Electrical Apparatus. T. F. Crocker, Dayton, O. An automatic telephone system with a number of relays, magnets and thermostatic time switches.

1,037,452. Electrical Apparatus for Transmitting and Receiving Signals. A. T. Dawson and G. T. Buckham, assignors to Vickers, Ltd., Westminster, England. A range apparatus has interconnectable switches at the transmitting station and corresponding motors at the receiving station.

1,037,454. Automatic Cutout for Trip Valves. E. H. Dewson, assignor to Westinghouse Air Brake Co., Pittsburgh, Pa. A solenoid controlled by track contacts can shift the valve.

1,037,469. Process of Metallizing Electrotype Molds. H. E. Goldberg, Chicago, Ill. A conductive surface is formed on the mold by applying a colloidal solution of a metal in a volatile solvent.

1,037,470. Mail-Box Alarm. M. W. Grindle, Santa Rosa, Cal. Insertion of mail closes the alarm circuit.

1,037,471. Safety Mechanism for Embroidering Machines. J. A. Groebli, assignor to A. H. Kursheedt, New York, N. Y. Includes visible and audible electric alarms and a stop motion.

1,037,485. Electrical Appliance for Gas Engines. J. W. Jepson, Depew, N. Y., assignor to Gould Coupler Co. Has a double-current generator sup-

plying direct current to a storage battery and alternating current to the ignition circuit.

1,037,491. Ignition Apparatus for Explosion Motors. C. F. Kettering, Dayton, O., assignor to Dayton Engineering Laboratories Co. Spark-controlling apparatus.

1,037,492. Ignition System. C. F. Kettering, assignor to Dayton Engineering Laboratories Co. Distributer apparatus.

1,037,500. Ozonizer. R. M. Leggett, Ann Arbor, Mich., assignor of one-fourth each to M. J. Fritz, F. I. Cornwell and T. F. Hutzel. Air is passed under pressure between electrodes producing a silent discharge.

1,037,507. Lubricating Trolley. G. H. Merwin, Millford, Conn. Provides continuous lubrication for the wheel.

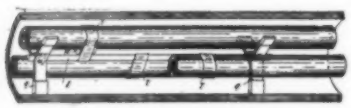
1,037,522. Electric Cable. V. P. von Pindtershofen, Wiener-Neustadt, Austria-Hungary. High-tension cable with each conductor in an insulating tube having a concentric air space about the conductor and the tubes surrounded by air in an outer sheath.

1,037,525. Rotary Contact for Snap Switches. C. D. Platt, Bridgeport, Conn. Has upper and lower arms crossing at right angles.

1,037,526. Explosive Engine. H. J. Podlesák, Chicago, Ill. The ignition system includes a magneto, an induction coil and a condenser.

1,037,536. Treatment of Molten Steel. J. W. Richards, South Bethlehem, Pa. Is kept for some time in an electric induction furnace before casting.

1,037,537. Ringer for Telephones. H. J. Roberts, Evanston, Ill., assignor to Homer Roberts Telephone Co. A



1,037,522.—High-Tension Cable.

polarized bell with permanent and electromagnets.

1,037,550. Pressure Indicator. W. Seymour, Grand Rapids, Mich. One conical vessel is connected at the top with the air pressure to be measured and at the bottom with a similar vessel in which are submerged a diverging pair of voltmeter terminals.

1,037,558. Alternating-Current Rectifier. C. P. Steinmetz, assignor to General Electric Co. The cathode consists of silver amalgam.

1,037,563. Magnetic Separator. G. Ullrich, Broken Hill, N. S. W., Australia. Includes a set of radial poles and a rotating magnetic ring between which the material is conveyed.

1,037,566. Electric Signal Lamp. W. J. Warder, Jr., Chicago, Ill., assignor to Adams & Westlake Co. Two lamps are arranged so that, if one is burned out or broken, the other is substituted.

1,037,573. Electric Heater. C. H. Allen, assignor to Troy Laundry Machinery Co., Chicago, Ill. The heating element is inside a hollow roll.

1,037,575. Flexible Chain for Lighting Fixtures. L. W. Andersen, assignor to Plume & Atwood Manufacturing Co., Waterbury, Conn. Consists of a number of shells, each having two parts screwed together, and tubular spacers joining the shells.

1,037,580. Circuit-Controlling Mechanism. F. Bechoff, assignor to General Electric Co. A rotatable actuator moves axially to bring two contacts together.

1,037,585. Electrolysis of Liquids. J. Billiter, Vienna, Austria-Hungary. Horizontal cathodes are surrounded by membrane conduits.

1,037,603. Electrical Musical Instrument. H. R. Dicks, Grey Eagle, Minn. Each key controls a separate bell and battery circuit.

1,037,606. Electrical Contact for Railway-Crossing Bells. E. D. Every, Mason, Mich. Secured to the rail is a depressible contact bar.

1,037,636. Telephone System. J. Kennedy, assignor to Dean Electric Co., Elyria, O. Relates to the supervisory signals and relays.

1,037,637. Electrically Operable Open-at-Will Elevator-Gate Mechanism. W. H. Kienker, Richmond, Ind. The gate at any floor can be raised by means of a motor and two long rods in the shaft.

1,037,643. Driving Mechanism for Clocks. J. Kuhn, assignor to Joseph Mayer & Bros., Seattle, Wash. An electric motor periodically raises the weight.

1,037,653. Starting Device for Internal-Combustion Engines. R. H. Muntz, assignor to Geiszler Starting Device Co., New York, N. Y. An electrically operated selector controls the explosive charge.

1,037,673. Automatic Train-Controlling System. F. D. Shindel, Huntingdon, Pa. A contact along the track is adapted to close electric circuits that cut off power and apply the brakes.

1,037,683. Current-Regulating Device or Resistance Applicable for Electric Lighting or Heating. W. Sumner, Liverpool, Eng. A fibrous material impregnated with carbon and insulating matter is coiled to form a pad, heated and finally cooled, forming a compressible resistance.

1,037,710. Clock-Controlled Switch. T. A. Zimmerman, Swissvale, Pa. The clock is geared to ratchet wheels on the switch arbor.

1,037,732. Non-Vibrator Ignition Apparatus for Internal-Combustion Engines. M. B. Crist and M. R. Wells, assignors to Colonial Trust Co., Pittsburgh, Pa. Includes a liquid circuit-breaker.

1,037,744. Apparatus for a Process of Fumigation. F. M. Duncan, Los Angeles, and W. S. Eisenberg, Alhambra, Cal.; said Duncan assignor of one-fourth of the whole right to E. H. Fosdick. Comprises nitrogen and acetylene tanks, a battery and a high-tension discharge apparatus.

1,037,767. Alarm. S. Hoge, Waynesburg, Pa. Has a fluid-actuated circuit-closer.

1,037,771. Food-Carrier. J. Hughes, assignor of one-half to Butte Engineering & Electric Co., San Francisco, Cal. A portable heat-insulated casing contains an electric heating unit.

1,037,779. Means for Holding Globes. A. Kusebauch, Pittsburgh, Pa., assignor to Nernst Lamp Co. Flexible fingers on the globe ring engage notches on the Nernst-lamp base.

1,037,818. Electric Time Switch. W. J. Brown, Boulder, Colo. Is controlled by the hour arbor of a chronometer.

1,037,825. Trolley-Wheel Retainer. S. A. Findura, McKeesport, Pa. Electromagnets hold retainers over the wire.

1,037,828. Spark-Timing Device. L. F. Goodspeed, Wilkinsburg, Pa. A contact member revolves in an annular casing.

Patents That Have Expired.

Following is a list of electrical patents (issued by the United States Patent Office) that expired September 10, 1912.

545,870. Electric-Railway Switch. R. A. Baldwin, South Norwalk, Conn.

545,903. Electric Signaling Apparatus. G. E. Miller, Boston, Mass.

545,904. Electric Signaling. G. E. Miller, Stoneham, Mass.

545,921. Telephone-Exchange Apparatus. A. Stromberg, A. Carlson, and H. L. Knight, Chicago, Ill.

545,922. Telephone Apparatus. A. Stromberg and A. Carlson, Chicago, Ill.

545,976. Manufacture of Electric or Other Conduits. E. L. Ransome, Chicago, Ill.

546,002. Electric Drill. C. S. Bradley, Avon, N. Y.

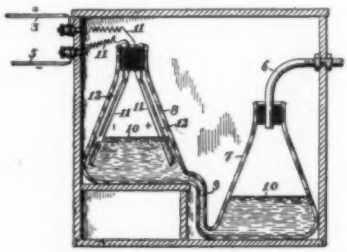
546,005. Flexible Conductor and Inclosed Conduit Therefor. L. Dion, Natick, Mass.

546,016. Electric Alarm Clock. W. Kist, Hoboken, N. J.

546,027. Telephone. E. C. Parker, London, Eng.

546,037. Signal Box. N. H. Suren, New York, N. Y.

546,059. Electric Railway. W. M. Schlesinger, Philadelphia, Pa.



1,037,550.—Pressure Indicator.

546,062. Speed Regulator for Electric Cars. I. D. Aikens, New York, N. Y.

546,090. Cut-off Actuating Mechanism for Gas or Electric Light Systems. F. W. Cotton, Dedham, Mass.

546,120. Electric Brake. W. Koedding, St. Louis, Mo.

546,130. Closed Conduit Electric Railway. J. M. Deal, Fernwood, Pa.

546,143. Electric Railway System. H. A. Fry, Portland, Ore.

546,190. Regulator for Alternating-Current Dynamos. E. W. Rice, Jr., Lynn, Mass.

546,191. Electric Locomotive. E. W. Rice, Jr., Schenectady, N. Y

546,220. Art of Manufacturing Electromagnets. H. P. Brown, New York, N. Y.

546,228. Signal Transmitter. W. H. Davis and H. C. Christy, Como, Colo.

546,232. Insulator, Conductor and Conduit for Electrical Wires and Cables. W. R. Hitchcock, Cornwall, Canada.

546,233. Automatic Electrical Cut-out. C. C. Kritzer, Grand Rapids, Mich.

546,238. Electric Igniter for Gas Engines. F. S. Mead, Montreal, Canada.

546,247. Electric Brake. W. B. Potter, Schenectady, N. Y.

546,261 and 546,262. Automatic Electric Fire Alarm. C. D. Tisdale, Boston, Mass.